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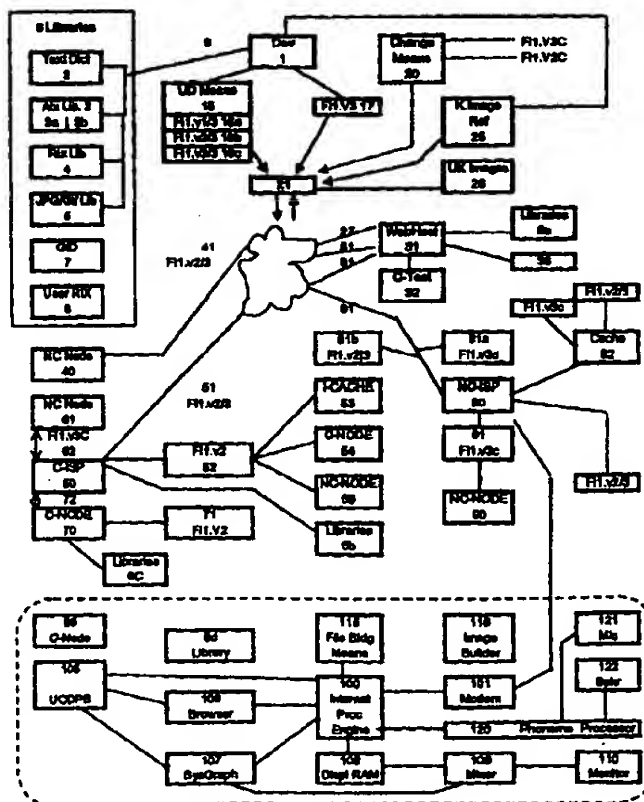
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(54) Title: INTERNET DATA REDUCTION SYSTEM

**(57) Abstract**

A file transfer method whereby a file is transferred between a server and a remote node over a network, wherein the file is reconstructed at least in part from information locally accessible to the node. The method encompasses transferring files over the Internet, wherein the files are reconstructed using dictionary lookup means. As well as a method for transmitting digital telephone conversations wherein the receiving unit includes a library of modules which represent in part the sending sound waveforms. Further disclosed are methods for naming image files used on the Internet wherein the images coupled to said files are known to be constant across a plurality of websites. A method for transferring image files from a server to a receiving node wherein the image is constructed at the receiving node in response to a series of commands. And a method for transferring data/information in optical format within an integrated circuit.



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1     **Title:**

2     **Internet Data Reduction System.**

3

4     **Description:**

5

6     The explosive growth of the Internet has resulted in network bandwidth congestion. Part of this congestion may  
7     be reduced by optimising the flow of information between Internet nodes.

8

9     The present invention describes a method and system to optimise, in part at least, the content and/or flow of said  
10    information. One aspect of the invention examines the commonality of much of the information traversing the  
11    Internet and seeks to take advantage of said commonality to reduce unnecessary duplication of information  
12    transfers.

13

14                     • The first part of the invention describes a **Partial File Update Means** that  
15                     conserves Internet bandwidth by constructing (at a remote node) a new version  
16                     of a file from an older version of the file stored on one or multiple caches  
17                     remote from a server (eg ISP and user caches). The remote node combines data  
18                     common to the old and new file with server supplied new data and server  
19                     supplied instructions on how to integrate the new and stored information.

20                     • The second part describes a **text compression means** that references  
21                     dictionaries locally accessible to one or more remote nodes.

22                     • The third part of the invention describes an **Image Data Reduction Means**  
23                     (**IDRM**). The first part of the IDRM, **Common Image Index** indexes images  
24                     such that the same image used across multiple web pages and/or websites is not  
25                     needlessly downloaded when already cached for another page. The second part  
26                     of IDRM, **Image Building Protocol (IBP)**, describes a means to construct  
27                     images by sending a series of commands that instruct a locally accessible (to the  
28                     user/ISP) paint program (and/or any other image creating means) to construct  
29                     the image. For example, paint programs can create many spectacular effects  
30                     with a few keyboard/mouse commands. For example, 100 bytes of mouse  
31                     commands may be used to create an image that is 16K in compressed form. An  
32                     extension of IBP builds complex images from component images. The  
33                     component images may be conventionally transmitted (eg jpg, gif) and/or  
34                     constructed using the image building protocol (and/or any other means).

35                     • The fourth part describes a means to reduce the bandwidth of telephone  
36                     conversations via the Internet (and/or any other means). This preferably converts  
37                     digitised voice into a series of digital phonemes that are enhanced by the use of  
38                     various descriptors.

39                     • The fifth part describes a means to capture free to air and/or other broadcast  
40                     means as a source of video information.

41

1 Some of the means of the invention are processor intensive. Optimal practical applications may require intensive  
2 use of distributed processing, particularly at web host sites, image databases and ISP's. This distributed data  
3 procesing may be significantly enhanced by a means of optical connectivity. Said optical connectivity has been  
4 developed to enhance the apparatus of the present invention, however, it may have application elsewhere.

5  
6 The invention may include (as non-limiting examples) one or more of the following benefits to participants of the  
7 Internet:

- 8 • conservation of available bandwidth,
- 9 • reduced file transfer times from server to ISP and/or directly connected end-users,
- 10 • reduced file transfer times from ISP to their end-users,
- 11 • reduced cost of accessing information from the Internet, for example,
  - 12 • users who are paying, in part at least, on the basis of quantity of information
  - 13 transferred should receive reduced overall data cost because of the reduction in
  - 14 average file size; and/or
  - 15 • a reduction in average file size may permit a reduction in the size of data
  - 16 pipelines or postpone the need to expand capacity,
- 17 • improved password protection,
- 18 • improved access time from servers, including web-servers,
- 19 • improved utilisation of mass storage devices used as servers, and/or caches (eg. proxy-servers)
- 20 and/or the end-users location.

21  
22 **The invention incorporates by reference the following:**

- 23 • Pending WO 98/54672 by Griffiths titled "Securely Metering Advertising in Data Processing Systems,
- 24 • Pending WO 97/25675 by Griffiths titled "A Secure Pay-As-You-Use System for Computer Software",
- 25 • Pending WO 96/27155 by Shear,
- 26 • Microsoft Corporation US Patent 5745095, titled "Compositing Digital Information on a Display Screen
- 27 Based on Screen Descriptors".
- 28 • Pending PCT AU99/00155 by Griffiths.

29 The invention allows for the use of any part at least of the means described in said referenced with part at least of  
30 the means of the invention.

31 The invention further allows that the present specification can be implemented by those experienced in the art by  
32 referencing to said specification and the documents incorporated by reference.

33  
34 This specification may use a User Controlled Data Processing System (UCDPS) as the remote node in describing  
35 part of the means of the invention. This is by way of example only. The means may be applies to any other node  
36 on the net, in particular ISP's.

37  
38 The means of the invention are described with reference to the Internet. They may also be applied in part at least  
39 for any other wide area network, and/or any LAN and/or to reduce local storage requirements at a UCDPS.

40  
41 **Definitions:**

1 **ISP or Internet Service Provider** is usually an entity that buys bulk access to the Internet and resells it to end-  
2 users. The end-users may be single users or part of one or multiple networks. An ISP may also be buying Internet  
3 access from a larger (and/or other) ISP. When there are multiple ISP's in the chain, the invention allows for any  
4 one or multiple, to each use part or all of the means of the invention. Some (usually larger) users may also have a  
5 direct connection to the Internet. In this case what is described as applicable to ISP's may also apply to this  
6 category of users. Part at least of the invention may also be applied to end-user systems.

7  
8 **Byte** equates to 8 bits and is used in this context, however, it is also representative of a more generic context. For  
9 example if a file (and/or any other data structure) is described as having a number (that may be any number) of  
10 bytes, this also allows for fractions of a byte. Reference to a number (that may be any number) of bytes may be  
11 used when information, in part at least, is collated into any grouping of words, long words and/or any other  
12 arrangement. Byte may be used when it is representative of any data types, eg program instructions and/or data;  
13 text (eg. acsii characters and or any other character set); and/or images; and/or sound.

14  
15 **File Server.** The term file server (or server) is generally used in this application to indicate the means that, in  
16 part at least, sources onto a network, part at least, of one or multiple files as described for the current invention.  
17 The server may serve web pages, and/or mail, and/or news, and/or any other types of files. The server may also  
18 be the recipient of files when information is loaded onto it. Multiple servers (that may be at different physical  
19 locations) may be used to deliver one at least files.

20  
21 The invention leverages the fact that one at least file server and/or file requesting node may have local access to  
22 data processing means capable of processing relatively large amounts of data each second, in contrast to the  
23 usually slow transfer of information between server and requesting node. While of particular application to the  
24 transfer of information between requesting nodes on the Internet, the invention, in part at least may be applied to  
25 any networked means (eg. Intranet), and/or local storage means.

26  
27 The invention may in part provide a means for server and/or requesting node to use their data processing  
28 capabilities to reduce the information content that actually needs to be transferred along the relatively slow parts  
29 of the network. The invention preferably does this without impairing file data.

30  
31 The server would usually be accessing its files from storage means local to the server (eg. that are linked by high  
32 speed local busses), however, part at least, of the files they access may be from one or multiple sources coupled,  
33 using any means, to said server. The term server also covers the situation where files are mirrored (in part at  
34 least) on multiple nodes.

35  
36 The invention also allows that the actual server of files, in part at least, does not deliver files compatible (in part  
37 at least) with the present invention,

38 and

39 that any one or multiple other nodes between the server and one or multiple requesting nodes, may obtain one at  
40 least said not compatible files from one or multiple servers (and or from any other means), in part at least,  
41 and said one or multiple other nodes may convert one at least said files, in part at least, to a format that is  
42 compatible with the invention.

Instances where this may occur (non-exclusively) may include:

- Telephone and/or other communication carriers, retrieving files and establishing their own caching means.
- One or multiple ISP's establishing a link (preferably high performance) to the Internet and adapting the invention, in part at least, to reduce the amount of traffic to other downstream nodes. This may be particularly useful to an overseas ISP who wants to reduce the cost of international traffic by establishing a domestic node to capture and compress information for subsequent transfer internationally. A similar principle may be applied for domestic ISP's with large bandwidth connections who may then squeeze more information along smaller downstream data pipes, including the transfer of information from ISP to end-user.

**Requesting node.** The term **requesting node** refers to one or multiple nodes coupled to a network (usually the Internet or similar) that are requesting files from a server. Said requesting node(s) preferably have a file caching means (eg. a proxy-server, browser caches). The requesting node is usually an ISP. Said ISP may have one or multiple other ISP's coupled to them (via the Internet and/or via one or multiple other communications links). One or multiple ISP's are usually coupled (usually via telephone/modem connections) to one or multiple end-users using the ISP as a gateway into the Internet.

The term **requesting node** may also be applied to one or multiple end-users. Said end-users may be one user, and/or multiple users (eg. connected via one or multiple networks). The end-user may have a direct connection to the Internet and/or via one or multiple ISP (and/or any other means). The term **remote node** is usually interchangeable with the term **requesting node**.

Said file caching means may include:

- one or multiple storage devices coupled locally and/or remotely to one or multiple ISP's;
- and/or
- one or multiple storage devices coupled to one or multiple end-users.

The invention also describes a means that enables one or multiple storage means coupled locally to one or multiple end-users to become part of one or multiple ISP caching means. This may allow the ISP to source information from one or multiple end-users for distribution to one or multiple other end-users. Information that is sourced from end-users may also be used to reduce the amount of information that needs to be downloaded from a server to refresh cache means coupled to the requesting node.

The invention also describes a means to:

- assist in ensuring the integrity of information obtained by said ISP caching means, from one or multiple end-user caches
- and/or
- assist in maintaining the integrity of one or multiple end-user systems when information is transferred to them.

The requesting node may also act as a server, for example, to upload files to a website, and/or to serve files to end-users, and/or for any other reason.

## 1. Partial File Transfer.

The amount of data traffic on the Internet (and/or any other network) may be partially reduced by the use of various caching means attached to ISP and/or end-user data processing means. Said caching means usually store previously downloaded files and delivers the stored file(s) when a request is made for access. A means is usually provided to ensure the stored file is current. The preferred method used by the known art to ensure file currency is to access the file server, read the date the file was last modified and if the same as the cached version, deliver the cached file rather than downloading from the server. However, much of this file transfer reduction potential is wasted because even a minor change in a file on one at least servers may force the cache to update itself by downloading the new file in its entirety.

It is one objective of the present invention to describe a Partial File Transfer Means that may be used to reduce the amount of information retrieved from a server when a file is updated.

**Background to Internet File Caching.** When an end-user sends a packet requesting retrieval of a file from a server their ISP may intercept this request and check for the presence of the file on their local cache. If the information is not cached, the request is usually forwarded to the target server. When the file is retrieved, it may be cached with the ISP as well as being passed on to the requesting user.

If the user requested file is already stored within the cache, the preferred procedure is for the ISP to access the target server and retrieve the date that the file was last updated. This is usually compared with the date code in the cached file and if equal, the cached file is usually supplied to the end-user. If the date code is invalid, the file is usually retrieved from the server.

Present methods for cache refreshing may waste a lot of Internet bandwidth. Even minor changes to a file may oblige the ISP to retrieve the entire file. This is despite the obsolete file in the cache usually including part of the data found in the new version of the file. The end-user may also have varying amounts of the file data in their local caches.

Part of the present invention seeks to describe a means for constructing (preferably faithful) copies of file(s) on one at least nodes remote to a file server using a combination of:

- information locally accessible to said nodes remote
- and
- information supplied by said files server.

The **locally available information** is usually an older version of the file stored on a cache. The older file is usually one previously downloaded from a server, however, it too may have been constructed using one at least means described for the present invention. The older file may have been delivered using any other means, for example, on optical media (eg. CD, DVD). Locally available may include any relevant information that can be accessed faster



and/or cheaper than that obtained by accessing the file server. It would usually include caches maintained by an ISP, however, it may include as non-limiting examples caches connected to one at least customers of the ISP and/or other ISP's (and/or their customers).

The information provided by said file server is preferably the minimum amount required by the remote node to construct an accurate copy of the new file.

1.a) Part of the present invention seeks to describe a **partial file update means** that updates an obsolete file at a requesting node with current file data stored on one at least file servers, wherein said update means:

- informs one or multiple file servers about, part at least of, the file information currently in one at least requesting nodes (eg at an ISP and/or end-user), and/or
- sends from said server, in part at least, the information (preferably the minimal amount) needed to create an updated (and preferably current) file in said remote cache(s), using in part at least, information in cached files, in particular the obsolete version of said current file.

Moreover, the invention is preferably configured to handle multiple degrees of file obsolescence. For example a current file may be File.4.html. One ISP may have cached File.3.html (the preceding version), another may have File.2.html, another File.1.html. The invention may be configured to allow each cached file to be able to use the partial file update means. Usually a more obsolete file requires more data to refresh it than more recent versions. The invention may also be configured such that ISP's and/or any other nodes without a partial file update means may continue to receive files in the normal manner. The invention may also be extended to provide partial file transfer capability to the end-user and/or between end-users.

A new version of a file loaded onto an Internet file server (eg. a web page server) may include information that is present in older versions of said file (and/or one or multiple other cached files) on one at least remote cache means. The amount of duplicated information may vary from most (or all) of the file to a few words. When a file has been renamed all of its contents may be identical with cached versions stored under the old file name. Useful information in an old version of a file (and/or any other files) may be from one to n blocks in number, and each block may represent any number of bits and/or bytes. The construction of a new version of a file from data in an obsolete version of the file may use any one or multiple means. This may include:

1.a.i) a means (**File.remote\_version**) for the file server (and/or one at least intermediary and/or coupled nodes and/or any other means) to determine which version of one at least files are present on said one or multiple requesting nodes;

and/or

1.a.ii) a means (**File.remote\_contents\_history**) for the file server (and/or, one at least intermediary and/or coupled nodes and/or any other means) to determine, in part at least, the information content within (and/or coupled to) one at least files present on said one or multiple requesting nodes;

and/or

1 1.a.iii) a means (**File.remote\_block.n\_location**, where n may = any  
2 number) for the file server (and/or; one at least intermediary and/or coupled  
3 nodes and/or any other means) to determine, in part at least, the location(s)  
4 of one or multiple blocks (and/or parts of blocks) of bytes within one at  
5 least files on said one or multiple requesting nodes, in particular the  
6 location(s) of byte strings (said string may be any length greater than zero)  
7 that may be used in building, in part at least, a new file at said one or  
8 multiple requesting nodes from:

- 9 • information within older versions of said file and/or  
10 one at least other files,

11 and/or

- 12 • said one at least servers;

13 and/or

14 1.a.iv) a means (**File.remote\_block.n\_start\_location**, where n may be any  
15 number) for the file server (and/or; one at least intermediary and/or coupled  
16 nodes and/or any other means) to indicate to one or multiple requesting  
17 nodes the start locations of one or multiple blocks of bytes (and/or part  
18 blocks) that are to be incorporated into said new file, in part at least;

19 and/or

20 1.a.v) a means (**File.remote\_block.n\_length**, where n may be any number)  
21 for the file server (and/or, one at least intermediary and/or coupled nodes  
22 and/or any other means) to indicate, in part at least, to one or multiple  
23 requesting nodes, the number of bytes in said one or multiple blocks as  
24 described in (1.a.iv);

25 and/or

26 1.a.vi) a means (**File.remote.new\_block.n\_location**, where n may be any  
27 number) for the file server (and/or, one at least intermediary and/or coupled  
28 nodes and/or any other means) to indicate, in part at least, to one or  
29 multiple requesting nodes that are constructing, in part at least, a new file  
30 from locally and/or remotely accessible information, the location in said  
31 new file in which to place block.n from the old file;

32 and/or

33 1.a.vii) a means (**File.new\_length**) for the file server (and/or, one at least  
34 intermediary and/or coupled nodes and/or any other means) to indicate to  
35 one or multiple requesting nodes the size of said new file;

36 and/or

37 1.a.viii) a means (**File.identity**) for the file server (and/or, one at least  
38 intermediary and/or coupled nodes and/or any other means) to indicate to  
39 one or multiple requesting nodes the name and/or version of the updated  
40 file, that may include the name of compression parameter extensions;

41 and/or

1 I.a.ix) a means (**Node.remote\_partial\_enabled**) for the file server (and/or,  
2 one at least intermediary and/or coupled nodes and/or any other means) to  
3 determine, in part at least, if said one or multiple requesting nodes may  
4 handle, in part at least, the partial file update means of the invention, and:

- 5 • if unable to handle partial file update means to preferably  
6 service these nodes appropriately;
- 7 • if the affirmative, preferably to service partial file capable  
8 nodes appropriately;

9 and/or

10 I.a.x) a means (**File.rename\_convert**) to retain in part at least, earlier  
11 details of a file that is renamed, and preferably advise caches to check for  
12 old names when requesting access to the new file names, and preferably to  
13 use information cached for the old file name(s) to build (in part at least) the  
14 file information corresponding to the new name .  
15

16 The invention also allows that one or multiple of (1.a.i) through (1.a.x) may be means that the server (and/or  
17 requesting node) may determine inherently. For example, a search engine may know that part of a page is  
18 repetitive from search to search. Said search engine may not re-send (in part at least) information expected to be  
19 already present in the requesting node.  
20

21 A simple embodiment will now be described. It assumes that there is a website called **www.example.com**. This  
22 is the server of the files described in this example. In practice, the server may have any name, and may be a web  
23 server and/or any other type of file server coupled directly and/or indirectly to the Internet.  
24

25 In the present example the server includes a file called **File.html**. This file(s) may be any name and the term **File**  
26 in **File.html** may be replaced by any file name. The file may also be any type and is not limited to **.html** files used  
27 in the example. Other common file formats (not exclusively) may include **GIF**, **jpg**, **acrobat**, **postscript**, **email**,  
28 **Microsoft Word** files, and **Wordperfect** files. The usual way of requesting this file from a server would be for the  
29 receiving node to send a **GET www.example.com/File.html** command (and/or a **GET IP address/File.html**).  
30

31 In the present example, **File.html** is 16 bytes long with each byte representing an **ASCII** character. In practical  
32 applications of the invention, the file may be any bit or byte length and the binary information may represent any  
33 one or multiple means. Said represents may include, characters of text and/or any one or multiple other symbol  
34 set, for example, images, sound, computer instructions/data etc.  
35

36 The preferred embodiment of the invention bases the file size on the number of bytes in said file. A file with one  
37 byte has a file size of \$01. It increments by 1 for each additional byte.  
38

39 The initial **File.html** in our example has a byte count of decimal 16 or Hex 10 (this is the preferred notation). Its  
40 **File.new\_length** = \$10. In practice the byte count may use any offset (plus or minus from 1) as its origin, and  
41 increment or decrement using any means. The count may also be expressed in any arrangement of bits (bits,  
42 nibbles, words, long-words) and or any other means.

The preferred method of locating bytes within the file is as an offset from an origin of zero, incrementing by one for each subsequent location. Any method may be used. The preferred embodiment gives each byte a hexadecimal address. For example, in File.html below, the first C is at location \$0000 and the Q is at location \$000F.

File.html = C G A B C D E F F A D Z M J K Q \_Date 0

This file would usually be initially uploaded to a server, and if available for unrestricted access, downloaded by users as required. A date code and or any other means may be coupled to File.html enabling various requesting nodes to determine the validity of File.html. The date code an/or any other information may be part of the file and/or within one at least other files.

Let us assume that at some time (date 1) the contents of File.html are changed to:

Z Z X A B C D E F F A D Z E J K \_Date 1.

Current methods of accessing this file on the net usually require all of this information to be downloaded, replacing the existing cached file (if present). The present invention would usually be configured to allow this normal process to operate, and a file called File.html would usually be available as expected by current Internet processes. However, as the bytes in locations \$03 to \$0c in File.html with a date code, Date\_1, are identical to bytes in locations \$02 to \$0b in the Date 0 version of the file, it may be more efficient to transmit:

- the new information and
- a means to the target node that allows it to extract (in part at least) information from any cached versions of File.html with a date code of Date 0.

The present invention describes a means for requesting nodes to access partial files from a server. This may also be referenced as the **File Building Protocol** or **FBP**.

Partial file downloading may be for any reason (eg. only part of a download was completed). In the current context, the request will usually be for the server to provide only that information needed to allow the requesting node to reconstruct locally cached information into a preferably complete copy of the current version of File.html on the server.

The preferred embodiment of the invention has one at least servers that may deliver a current version of File.html and one or multiple modified versions of the current file. The modified versions usually contain sufficient information to allow a requesting node (in part at least) to integrate cached information with transmitted information to reproduce the current File.html. Any means may be used to identify said one or multiple modified versions of File.html. The preferred means adds an extension to the file name, eg File\_fbp\_1.html.

When an FBP compliant requesting node wants to download File.html it may require a means to determine if the server for File.html is able to deliver \_fbp\_x (where x may be any value) type files. Said means to determine preferably does not disrupt files delivered to non-FBP compliant requesting nodes. One method that may be used

1 in the preferred embodiment is duplication on the server of the current version of File.htm and its renaming to  
2 **File\_fbp\_0.html.**

3

4 A non-FBP compliant requesting node may place a GET command for File.html and have it delivered by FBP  
5 compliant and non-compliant servers.

6

7 FBP compliant nodes may place a GET command for File\_fbp\_0.html. This is one means of signaling FBP  
8 servers that the requesting node is also FBP compliant. The fact that the requesting node receives a favourable  
9 response may be an inherent means for the server to indicate to the requesting node that said server is FBP  
10 compliant.

11

12 A non-FBP compliant server would usually send the requesting node 'a file not found' message. The subsequent  
13 normal course of action is for the requesting node to perform a normal GET File.html.

14

15 Any one or multiple means may be allowed for a requesting node to determine FBP availability. The following  
16 may include some of said means:

17

18 • A lookup means, eg. similar to the DNS (Domain Names Server).

19

20 • The invention also allows for at least one FBP compliant requesting node to issue the normal GET File.html  
21 command and use additional information embedded within File.html to determine if the server is FBP  
22 compliant. Said embedded information is preferably transparent to normal file handling processes. In the  
23 case of HTML files, this additional information may appear to normal processes as comments (a method that  
24 is known to those experienced in the art, in particular to those adding additional functions to HTML code).

25

26 • The inclusion of a FBP compliant identifying means in the domain name of the website. For example,  
27 www.example.com may become www.example.fbp.

28

29 • One at least site detail files (**Site.info**) may also be kept at www.example.com, detailing the capabilities of  
30 the site. Site.info may include any information, eg. available compression means, security, password  
31 protection, ability to run scripts and/or any other programs, ability to integrate with databases, ability to act  
32 as one at least E-mail box etc.

33

34 Using the current example, the following versions of File.html may be on the server:

35 File.html = **C G A B C D E F F A D Z M J K Q \_Date 0**

36 File\_fbp\_0.html = **C G A B C D E F F A D Z M J K Q \_Date 0**

37

38 Alternatively, if using embedded information within File.html to identify the file (and/or server) as FBP  
39 compliant, our example may include:

40 • File.html = **C G A B C D E F F A D Z M J K Q \_Date 0\_FBP.identifier.**

41 The FBP.identifier may also be used as a means to indicate whether other files (and/or which files) on a related  
42 web-site (or server) are FBP compliant.

1  
2 In the preferred embodiment both methods are combined, such that the following are available from the server:

3 **File.html = C G A B C D E F F A D Z M J K Q \_Date 0 \_FBP.identifier.**

4 **File\_fbp\_0.html = C G A B C D E F F A D Z M J K Q \_Date 0 \_FBP.identifier.**

5  
6 The invention allows for any means for:

- 7 • the requesting node to determine the currency of server files (eg. request date information as per the norm),  
8 and/or  
9 • the server to transfer update information to the requesting node.

10  
11 If an FBP compliant requesting node needs to re-access a previously downloaded File.html, the preferred  
12 embodiment may have the server provide information about file currency together with any update information  
13 by one or multiple responses. The requesting node may request this information by one or multiple requests. This  
14 may use any one or multiple means.

15  
16 In the preferred embodiment, the server is able to make available:

17 1) A complete version of the current file that is accessible by non-compliant nodes (eg. the means used  
18 by the known art). In the present non-limiting example this is identified as **File.html**.

19  
20 2) A complete version of the current file that may be used by compliant nodes (eg. those designed to use  
21 the invention). This is identified as **File\_fbp\_0.html** and would usually be accessed when a node  
22 accesses the file for the first time and/or the node has a sufficiently old version of the file in its cache  
23 that the server no longer maintains a partial update file.

24  
25 3) One or multiple partial versions of File.html that maybe used by compliant nodes to update obsolete  
26 versions of the file stored in their caches. These are preferably identified as **File\_fbp\_1.html** through to  
27 **File\_fbp\_y.html**. The character 'y' is preferably an integer that may vary from one to any integer value  
28 (eg. y=1 for version 1 of the file). In the preferred embodiment, the value of 'y' is coupled to a particular  
29 version of File.html. Usually the greater the value of 'y', the more recent the version of File.html that it  
30 is coupled to. When the value of y equals the current version number of file\_fbp\_0.html the remote  
31 node has a current version of the file.

32  
33 In the preferred embodiment a remote node requests the server to send the File\_fbp\_y.html where the value of 'y'  
34 is equivalent to the most recent version number of File.html coupled to the requesting nodes cache means.  
35 File\_fbp\_y.html preferably contains sufficient information (in part at least) that the FBP means at the requesting  
36 node may reconstruct a replica of the latest version of File.html (and/or File\_fbp\_0.html).

37  
38 If the version of File.html coupled to a requesting node is the same as that at the server, File\_fbp\_y.html  
39 preferably only contains sufficient information to indicate that the requesting node cache means has a valid  
40 version of the file. If the requesting node cache means has an obsolete version of the file, the File\_fbp\_y.html  
41 preferably includes information to advise the requesting node of this fact and (in part at least) sufficient  
42 information to update the obsolete file to the current version.

1  
2 The invention allows that those experienced in the art may readily adapt the preferred embodiment of the  
3 invention such that a request to server for update information may use multiple rather than a single requesting  
4 means (eg. a request for file validity and another for actual update information). The server may also return  
5 information as one or multiple files (and/or any other data structures).

6  
7 The preferred embodiment allocates a value of 1 to 'y' when File.html is first loaded onto the server. The  
8 preferred means of coupling the version number of a file to its file includes lookup tables and/or embedding the  
9 version number in the file.

10  
11 The value of 'y' is preferably incremented for each updated version of the file. Any node that downloads the  
12 initial version of the file preferably receives a **version.identifier** = 1. Any means may be used to transfer the  
13 **version.identifier** to one or multiple requesting nodes. The preferred means embeds this information within  
14 **FPB.identifier**.

15  
16 When a requesting node needs to check the validity of the version of File.html held in its cache, it may issue a  
17 GET File\_fbp\_1.html. The information returned in File\_fbp\_1.html preferably includes all the information  
18 needed to update the cached file. Whenever File.html is updated on the server, File\_fbp\_1.html is preferably  
19 changed on the server to include these updates. In this manner, each time a requesting node requests  
20 File\_fbp\_1.html, it receives information that will update it to the current file contents. When the file is updated at  
21 the remote node, it is usually provided with an updated **version.identifier** associating it with the newer version of  
22 the file.

23 For example, if the cache were updated with version 4 of the file, its 'y' value preferably becomes 4 and  
24 the next time the requesting node checks for the validity of File.html in its cache it would issue a GET  
25 File\_fbp\_4.html.

26 Any means may be used to update the **version.identifier**. The preferred means transfers **version.identifier** as part  
27 of **FPB.identifier**. The latter is preferably included, in part at least, within the File\_fbp\_y.html. The server may  
28 have multiple File\_fbp\_y.html, with values of y (for example) from 1 to a number representing the latest version  
29 of the file. In practice it may not be desirable to maintain information to update cached files beyond a certain time  
30 (and/or any other criteria). The preferred means to accommodate requests for deleted **\_fbp\_y** files is to send the  
31 current version of File\_fbp\_0.html (effectively the entire file). This does not usually require access to earlier  
32 versions of the file.

33  
34 The value of 'y' in a GET request for File\_fbp\_y.html implicitly advises the server of the current version of the  
35 file in the remote cache, providing a **File.remote\_version** means as described in (1.a.i). The transfer of a new  
36 **version.identifier** with File\_fbp\_y.html also provides the **File.Identity** means of (1.a.viii).

37  
38 If the value of 'y' in a GET File\_fbp\_y.html matches the version number coupled to the current file.html on one or  
39 multiple servers, said File\_fbp\_y.html is preferably a minimalist file with sufficient information to inform the  
40 requesting node that the File.html in its cache is current.

Any means may be used to advise one or multiple requesting nodes that their cache information is valid, with the preferred embodiment including a **File.advice** flag within **File\_fbp\_y.html**. The preferred method has a base file size of one byte (this usually refers to actual file contents, not other file structure overheads, if any) for the **File\_fbp\_y.html** coupled to the current version of **File.html**.

If the file in the remote cache is valid, **File.advice** is usually \$00. This only requires a minimal data packet to instruct the requesting node to use its cached information.

Any information may be included in **File\_fbp\_y.html** and/or **File.advice**. Options that may be useful may include:

- **File.valid** flag = time and/or date file last updated;  
and/or
- **File.now** flag = time and/or date stamp that the cache checked for validity.

The **File.now** flag may be particularly useful for users who wish to check that their ISP is actually checking with a file server to ensure that their cached files match those currently on one or multiple servers. When the user requests a file that includes the **File.now** facility, the time/date stamp should usually be within a few seconds of the date on the user's computer (after time-zone adjustments if not using a standardised time base). Some ISP's may be tempted to synthesise **File.now** contents. To help prevent this, the invention also describes a means (that may be any means) to ensure that **File.now** is legitimate.

The most current **File\_fbp\_y.html** may include \$00\_**File.valid**\_**File.now**.

The preferred means of preventing unauthorised changes to **File.now** contents is to have the server include a validation key (**File.now\_valid**) within and/or coupled to **File\_fbp\_y.html**. An ISP and/or any other intermediate node preferably has no means of generating **File.now.valid**. The preferred method for the user to check validity of **File.now.valid** is to send the key to a third party with the means to validate and confirm **File.now.valid**. An alternative is to provide a secure processing means at the end-user location and perform validation in a tamperproof means. Another alternative is for the server to generate **File.now.valid** with a private key (eg DES) and the end-user decodes this with a matching public key. These are methods known to those experienced in the art. An ISP and/or any other node may apply a similar process to test the integrity (and/or for any other reason) of any one or multiple intermediaries between them and the server.

On the Internet, datagrams with small amounts of data may contain a high proportion of protocol information (eg. IP and TCP).

To further improve efficiency of transfers, the invention allows that a request from a particular node for validation information on multiple files may result in the server sending multiple answers in the one datagram. This method may also be adapted to improve efficiency of nodes that are not FBP compliant, when accessing date (and/or any other) information on server files. This may be an automatic response, however, it is preferable that the requesting node actually request this facility. The preferred embodiment has the requesting node include a **multiple\_request** flag in a GET **File\_fbp\_y.html** request file that is part of a multiple request. For example, **File\_fbp\_y.x.html**, where x may be any code, preferably a number 1-9 (it may be any value). A request from a node to a server for multiple files on that server may be constructed using any means. The .x may also be deleted



1 and the position of the various strings used as a default numbering system. The preferred method of formulating a  
2 multi-file request may include the following format:

3 **File.a\_fbp\_y.1/html\_File.b\_fbp\_y.2/html\_.....File.z\_fbp\_y.n/html\_filerequestID.html.**

4 The packetID may be used by the server as a reference when the requesting node receives a response from the  
5 server (and/or for any other purpose). The invention allows that a requesting node may only require (in part at  
6 least) information about cached file that are still valid, rather than updating one or multiple of cached files that  
7 are invalid. Any means may be used, with the preferred method embedding a flag within **filerequest\_ID**. The  
8 invention allows for any means that permits the requesting nodes to determine if one at least files in its cache is  
9 valid without receiving update information if the file(s) is invalid. The preferred means may include a multi-file  
10 request with only the relevant file included. An alternate preferred embodiment modifies the **File\_fbp\_y.html** to  
11 indicate that this is an information only request. One methods to do this changes the format to **File\_fbp\_i\_y.html**.

12

13 Any means may be used by the server to provide one or multiple requesting nodes with a multi-file response.  
14 The preferred means envelopes cache files that are valid within the one response. Other files are usually handled  
15 by discrete responses (see below). The following is one method:

16 **filerequestID\_fileID(eg. x=1)\_fileID(eg. x=2)\_fileID(eg. x=n).**

17

18 Returning to our example file, when the server is initially loaded with **File.html**, it is preferably capable of  
19 delivering the following related files:

20

21 **File.html = C G A B C D E F F A D Z M J K Q \_Date 0 \_FBP.identifier\_version= 1.**

22 **File\_fbp\_0.html = CGABCDEFADZMJKQ \_Date 0 \_FBP.identifier\_version = 1.**

23 **File\_fbp\_1.html = \$00\_File.valid\_File.now**

24

25 A FBP compliant requesting node needing to check the validity of its version of **File.html** would usually extract  
26 the 1 from the version number and use this as the one in the GET **File\_fbp\_1.html** request.

27

28 The next step describes the effects of modifying **File.html**.

29 **File.html = Z Z X A B C D E F F A D Z E J K \_Date 1 \_FBP.identifier\_version= 2.**

30 **File\_fbp\_0.html = ZZXABCDEFADZEJK \_Date 1 \_FBP.identifier\_version= 2.**

31 A new file is created: **File\_fbp\_2.html = \$00\_File.valid\_File.now.**

32 A requesting node that caches version 2 of **File.html** would usually send a GET **File\_fbp\_2.html** when it needs to  
33 check the validity of a cached file. However, any requesting nodes with version 1 of the file would usually have  
34 an invalid (in part at least) file in their cache means. Consequently **File\_fbp\_1.html** requires modification to  
35 reflect these changes.

36 The preferred embodiment allows for any means for the server to inform a remote cache that its file is not valid.

37 One method changes the value of the first byte from \$00 to \$FF.

38 Therefore **File\_fbp\_1.html** may be represented by **\$FF\_File.valid\_File.now.**

39 This may instruct the cache that its file is invalid, however, it does not usually provide information about how the  
40 file may be updated (apart from a default decision to download a new copy of the file). The preferred method  
41 includes update information (update.info).

42 **File\_fbp\_1.html preferably = \$FF\_File.valid\_File.now\_Update.info.**

1 The information within Update.info is preferably sufficient to enable at least one remote caching means to update  
2 cached information. The length of File\_fbp\_1.html is preferably a smaller file than that required to download the  
3 new version of File.html.

4 A comparison of the two versions of the file reveals that the bytes in locations \$02 through \$0B of version 1  
5 correspond to locations \$03 through \$0C of version 2.

6 **CG ABCDEF FADZ MJKQ**

7 **ZZX ABCDEF FADZEJK**

8 The preferred embodiment of the invention has the server include File.new\_length means in File\_fbp\_y.html.

9 This advises the requesting node about the size of the new file. In the case of version 2, File.new\_length = \$F0.

10 The preferred embodiment has the requesting node (and/or any coupled nodes) slot new information (preferably  
11 supplied by the server) together with useful cached information (usually stored at the remote node) into  
12 appropriate locations in the new file template.

13 The preferred embodiment of the invention has the server transfer information to the requesting node (and/or one  
14 or multiple coupled nodes) describing the location of one or multiple blocks of usable information in the cached  
15 file. This is one means of implementing File.remote\_block.n\_start\_location (1.a.iii). The preferred means uses  
16 the first byte in the existing cached file as a reference point. Its location is \$00, the next byte \$01 etc. The  
17 preferred maximum size is 64K, allowing locations to be pinpointed using two bytes. If the file is larger than this,  
18 any means may be used (including expanding the number of bytes to pinpoint a particular location), however, the  
19 preferred method of handling larger files is to break them into pages.

20

21 In the present example there is only one overlapping block (for clarity the overlapping sequence JK in each  
22 version is excluded in this description) in version 1 that is useful and this is located at position \$02.

23 **File.remote\_Block.1\_start\_location = \$0002.**

24

25 The preferred embodiment of the invention has the server transfer information to the requesting node (and/or one  
26 or multiple coupled nodes) about the length (in number of bytes) of the usable string (or block) length starting  
27 from \_block.n\_start\_location. If it is one byte, the length is \$0001. This provides one means of implementing  
28 File.remote\_block.n\_length. In the present example there is only one relevant block and its size is 10 bytes. The  
29 File.remote\_block.1\_length = \$000A.

30

31 The preferred embodiment has the server transfer information to the requesting node (and/or one or multiple  
32 coupled nodes) about the location(s) in the new file that previously cached information may be placed. This is  
33 one means of implementing File.remote.new\_block.n\_location (1.a.vi). In the present example the block of  
34 information from version 1 of the file (\_block.1\_start = \$02 and \_block.1\_length = \$0a) is placed into location  
35 \$03 of the new file.

36 **File.remote.new\_block.1\_location = \$0003.**

37 At this stage the Update.info section of File\_fbp.1.html is preferably comprised of:

38 **\_block.1\_start\_location (\$0002) + \_block.1\_length (\$000A) + \_new\_block.1\_location (\$0003).**

39

40 Practical implementations of the invention will usually have multiple blocks of information shared between old  
41 and new versions of files. The preferred method is to arrange them sequentially as shown:

1   \_block.1\_start\_location, \_block.1\_length, \_new\_block.1\_location; \_block.2\_start\_location, \_block.2\_length,  
2   \_new\_block.2\_location;  
3   \_block.3\_start\_location, \_block.3\_length, \_new\_block.3\_location

4   .....

5   .....

6   .....

7   \_block.(n+1)\_start\_location, \_block.(n+1)\_length, \_new\_block.(n+1)\_location

8   \_block.n\_start\_location, \_block.n\_length, \_new\_block.n\_location.

9   The value of 'n' may be any number and/or any other symbolic means.

10   The preceding forms a map of usable cache information and where to place it in the new file. Collectively it  
11   forms a subset of Update.info called **Cache.map**.

12   At this stage, **File\_fbp\_1.html** =

13   **\$FF\_File.valid(optional)\_File.now(optional)\_\$0002\_\$000A\_\$0003.**

14

15   The invention also allows for:

16   any means that transfers part of a file from a server to a requesting node (and/or one or multiple coupled nodes)  
17   and/or

18   any means to direct the placement of said transferred part into a file structure on said requesting node (and/or  
19   coupled nodes),

20   wherein,

21   said file structure is a replica (in part at least) and/or will be a replica (in part at least) of one at least files on said  
22   server and/or coupled to said server.

23   The preferred embodiment of the invention makes it fairly straightforward to implement this means. As we have  
24   already specified:

25         a) the size of the new file to the requesting node (and/or one or multiple coupled nodes)

26   and

27         b) the information needed to move usable cache information into relevant slots in the new file structure,  
28   it is preferable to send a single block with the new information to said requesting node, in sequential order from  
29   start to finish. Said requesting node can then infer the location into which to slot this information as it will usually  
30   already have transferred all usable cache information into the new file structure. For example, when said  
31   requesting node is constructing the new file structure of version 2 of File.html, the requesting node usually has  
32   sufficient information from Cache.map to create the following:

33   **xxx A B C D E F F A D Zxxx** (x= as yet undetermined). Said requesting node preferably only needs to receive a  
34   data string in the order that it will place it into remaining slots, starting with unfilled location closest to the start  
35   of the new file (location \$00). In the present example said unfilled location is \$00. This string may also be  
36   referenced as **NewData.map**. This is the other part of Update.info. By sending ZZXEJK to said requesting node  
37   and combining it with Cache.map, said requesting node is usually able to completely reconstruct the file.

38   The usual full representation (excluding options) of **File\_fbp\_1.html** =

39   **\$FF \$0002 \$000A \$0003 Z Z X E J K.** (the alpha-characters are shown for clarity, they are usually stored as the  
40   hex equivalent of their ASCII code if characters. As previously noted, they may represent any coding means,  
41   including text, images, sound, program instructions/data etc.).

42

1 In summary, after File.html has been updated from version 1 to version 2, the server would usually be able to  
2 supply the following to meet the cache updating requirements of one or multiple remote requesting nodes.

3 File.html = Z Z X A B C D E F F A D Z E J K \_Date 1\_FBP.identifier\_version= 2.

4 File\_fbp\_0.html = ZZXABCDEFFADZMJK \_Date 1\_FBP.identifier\_version = 2.

5 File\_fbp\_1.html = SFF\_File.valid\_File.now\_ \$0002 \$000A \$0003 Z Z X E J K\_  
6 Date 1\_FBP.identifier\_version = 2

7 File\_fbp\_2.html = \$00\_File.valid\_File.now

8

9 Those experienced in the art will be able to extend this process to handle any number of file updates  
10 (File\_fbp\_y.html, where y may be any value from 1 to n). They will also be able to modify each of  
11 File\_fbp\_y.html for each value of y from 1 to n such that they suitably update cached files at remote nodes to the  
12 current version of File\_fbp\_0.html.

13

## 14 2) Text Compression Means

15

16 The next part of the application describes a means to reduce the amount of data required to represent the textual  
17 component of information, particularly information coupled, in part at least, to the Internet (that may include files  
18 and/or web page information). Said textual component may be representative of any natural language (eg. French,  
19 German, English) and/or any computer language (especially languages with a natural language component, eg  
20 Java, Javascript, HTML, Basic, Postscript, Adobe Acrobat), and/or word processor files (that may include  
21 Microsoft Word and/or Wordperfect compatible files); and/or any other symbolic representation.

22

23 2.a) The invention allows for any means (that may also referenced in this application as the Primary Text  
24 Compression Means or PTCM) that in part at least, shares the properties of (2.a.i) and/or (2.a.ii). Terms used in  
25 (2.a.i) and (2.a.ii) have the same definition.

26

27 2.a.i) A means that in part at least, reduces the bit and/or byte count required to store text information,

28

- within, and/or

29

- coupled in any other way (for example, directly and/or indirectly linked files, and/or implicitly  
30 linked files) to,

31

Internet Files and/or any other files,

32

wherein,

33

said bit and/or byte count reduction is dependent, in part at least, on information within and/or in any other  
34 way coupled to one or multiple Text Dictionary Means.

35

36 Said Internet Files may be:

37

any file,

38

and/or

39

any other data and/or program structure,

40

coupled to and/or potentially able to be coupled to:

41

one or multiple nodes of the Internet (and/or similar, eg Intranets, Networks),

42

and/or

in transit between said nodes.

Internet Files may include, in part at least:

- HTML files; and/or
- program files; and/or
- audio files (eg. sound files, packets carrying telephone conversations, packets carrying sound attached to video); and/or
- video files (eg. pre-recorded video, live video, video conferencing); and/or
- image files (.gif, .jpg, .syn); and/or
- constructed files (see later in this description); and/or
- word processor files (eg. Microsoft Word, Wordperfect etc.), and/or
- any other files and/or records and/or data structures and/or program structures.

Said **potentially able to be coupled**, may include any information that is not currently accessible to the Internet, however, it is in a format and/or may be converted to a format that may be coupled to the Internet (and/or equivalents). This may include, for example,

- information on optical media (eg. CD's, DVD's) and/or any other portable media, wherein said media is in transit and/or in any other way, not currently accessible to the Internet (eg. if the media is not mounted in a drive);

and/or

- information on one at least mass storage devices coupled to a user controlled data processing system, that is not currently connected to and or not currently accessible to the Internet ;

and/or

information on one at least mass storage devices at ISP's, and/or web-servers, and/or any other one or multiple Internet nodes, wherein said information is not currently accessible to the Internet.

Said transit between nodes may include any telecommunications means and/or transfer on any physical medium, in particular optical media (eg. CD ROM, DVD).

Said text information subject to the Primary Text Compression Means may also be referenced as **Compressible Text Information** (or CTI) when in plain text form, and/or **Dictionary Compressed Text** (or DCT) when compressed.

2.a.ii) Any means that in part at least reverses the bit and/or byte count reduction process described in (1.a.i) (usually to produce readable text and or information that may be usefully parsed, eg HTML code), wherein,

said reversal is dependent, in part at least, on information,

- within, and/or
- in any other way coupled to,

one or multiple **Text Dictionary Means**.

1  
2 The invention also allows for any means that applies, part at least, of 1.a.i and/or 1.a.ii to text information for any  
3 other purpose. This may include compression in part at least, of:

- 4 • information used in word processor documents (and/or equivalents); and/or
- 5 • electronic books, magazines, newspapers; and/or
- 6 • any other text applications.

7  
8 **2.b) The Text Dictionary Means** may be any means that provides one or multiple libraries of any symbolic  
9 elements, that may include:

- 10 • characters; and/or
- 11 • words; and/or
- 12 • phrases; and/or
- 13 • sentences; and/or
- 14 • paragraphs; and/or
- 15 • pages and/or part pages; and/or
- 16 • chapters; and/or
- 17 • pictograms; and/or
- 18 • part at least of previous versions of said one or multiple files containing text information (as referenced in  
19 1.a above), and/or any one or multiple other files; and/or
- 20 • any other symbolic representation and/or combination of symbolic representations (that may include  
21 sequences of symbols used to represent computer programs and/or data, for example HTML code,  
22 Javascript, Java, Acrobat, Postscript)

23 wherein,

24 part at least of said symbolic elements are actually and/or are potentially, directly and/or indirectly, representative  
25 of one or multiple text strings (usually of any length greater than zero) in one or multiple Internet files and/or any  
26 other files containing text information,

27 and

28 said symbolic elements are preferably arranged, in part at least, such that said one or multiple text  
29 strings in said one or multiple files containing text information, may be replaced by one or multiple  
30 direct and/or indirect pointers to said symbolic elements, (the usual process during text compression),  
31 and/or

32 said symbolic elements are preferably arranged, in part at least, such that said pointers may be replaced  
33 directly and/or indirectly, in part at least, with said symbolic elements that they point to, usually as a  
34 means to restore the original text information to said one or multiple text files (the usual process during  
35 decompression of previously compressed information).

36  
37 The Text Dictionary Means may in part at least, form part of one or multiple files containing its coupled  
38 Dictionary Compressed Text and/or may be, part at least, of any one or multiple other files and/or any other  
39 storage format means.

40  
41 **2.c) The preferred Text Dictionary Means** includes the use of one or multiple core text dictionaries, that in part  
42 at least, include one or multiple of the symbolic elements described in 2.b.

1  
2 The core text dictionaries are preferably supplied to multiple nodes on the Internet (and/or equivalent) in order to  
3 decompress files compressed, in part at least, using dictionary information. Core text dictionaries are usually  
4 resident on one or multiple devices local to each node using PTCM. DCT information may be created by one or  
5 multiple nodes, in part at least, using core text dictionaries; and/or at locations remote from nodes that  
6 decompress and/or transfer DCT information.

7  
8 When core text dictionaries are used in the compression and/or decompression of text that is to be supplied to one  
9 or multiple other parties (eg. one or multiple nodes on the Internet), part at least of their content is usually  
10 common across multiple locations.

11  
12 When core text dictionaries are used to compress text information for local use, eg. to improve file storage means  
13 on a mass storage device, the dictionary may be unique, in part at least, and may be customised to meet the  
14 specific data content of the files that it is compressing.

15  
16 The effectiveness of the Primary Text Compression Means is usually related, in part at least, to the success of  
17 replacing character (and/or any other symbolic) strings of information within Compressible Text Information,  
18 with pointers to equivalent strings in one or multiple core text dictionaries,  
19 such that,

20 the data used to store the pointer information (and/or any support code) is less than that used to maintain  
21 CTI in uncompressed form.

22  
23 The present invention allows that said pointers may be:

- 24
- direct pointers, and/or
  - used in part at least, in calculating one or multiple other pointers and or any other means (eg.  
26 jump tables) that directly and/or indirectly, in part at least, provide a means to regenerate, part  
27 at least of the original CTI, using part at least of the information within, one at least core text  
28 dictionaries.

29  
30 The present invention allows that said equivalent strings in the text dictionaries may be identical to  
31 their coupled text strings in the original CTI and/or they may have any indirect relationship (eg. the  
32 replacement may be a translation to another language and/or part of an encryption means).

33  
34 By creating a core text dictionary means that may be used in conjunction with multiple files containing CTI  
35 and/or DCT, and making said dictionary means accessible to one at least means that creates CTI from DCT, the  
36 number of bytes in said multiple files:

- 37
- may be reduced when stored on a mass storage means and restored, in part at least, to their normal  
38 content when required;

39 and/or

- 40
- may be reduced prior to transmission from at least one node on the Internet (and/or equivalent,  
41 including Intranets) to at least one other node, and restored in part at least, to their normal content  
42 when required, and/or transferred to one at least other nodes, that in part at least may be DCT

format. Said transmission may be telecommunications and/or the physical transfer of one or multiple media means (eg. removable drive cartridges, CD ROM's, DVD Discs etc.).

PTCM may be used in part at least, to compress text information stored on a mass storage means (eg. hard disks, CD ROM's, DVD's). This usually improves the number of files that can be stored on said mass storage means and preferably reduces the time to retrieve said files from said mass storage means.

A preferred embodiment of the invention describes a Data Interceptor Device that attaches to at least one hard drive, and/or CD ROM Drive, and/or DVD ROM Drive. It may selectively restore, part at least, of the original file information as it passes from the mass storage means, to one or multiple data processing units (eg. the server). Additionally, said device preferably creates Dictionary Compressed Text (DCT) from Compressible Text Information (CTI). Said device is referenced as a Data Interceptor Means (or DID).

An example of the use of a core text dictionary is now described - if the phrase 'Primary Text Compression Means' is used in a text file, the word 'Compression' may require 12 bytes in a file to store its eleven characters and the following space. A core text dictionary constructed for 64,000 different words and phrases that includes the word 'Compression' as one entry may permit the 12 bytes currently required for the word 'Compression' in CTI format to be compressed into:

2 bytes (to provide a unique address to the location of the string 'compression' in the 64,000 entry dictionary),

and

1 byte to represent the subsequent space.

The information required to represent the word compression is reduced by 75%. By using **Text Compression Rules**, it may be possible to gain additional savings. One application of Text Compression Rules may include a means to handle spaces between words, for example, it may be presumed that if another word follows the word 'compression', then a space following the last letter is the default. This default may be modified by other factors (eg. the presence of a comma or period). The use of a default 'space', reduces data storage requirements for 'Compression' from 12 to 2 bytes, a reduction of 83%. The capital 'C' in the word 'Compression' may be subject to a rule that has this is the default in the first word of a sentence, however, it may require additional information to represent it in other locations, as is the present situation. Said additional information may also be referred to in this application as **Text Compression Modifiers**.

Should the phrase 'Primary Text Compression Means' be an entry in the core text dictionary, the 31 bytes (including trailing space) can be compressed to 2 bytes. This is a size reduction of 93.5%.

The invention seeks to replace (preferably as much as possible) the text information of a file with pointers to information in one at least dictionaries at one at least remote nodes. Said dictionaries are preferably common across multiple nodes of the Internet (said nodes preferably include web-servers, and/or ISP's and/or end-users). Said dictionaries may include other files known to be present at a remote node.

Core dictionaries are preferably:

resident on devices that compress Compressible Text Information and/or reverse this compression;

and/or

readily accessible to said devices that compress CTI and/or the reverse.



The preferred core text dictionaries may be combined in part at least with any one or multiple other core text dictionaries and or any other types of dictionaries, and/or any other data and/or program structures.

Core text dictionaries may use any database format and/or other data structure.

Core text dictionaries may include any file and/or database and/or any other data structure that includes any combination (in part at least) of The preferred dictionary includes multiple character strings that may be words and/or phrases and/or sentences of alphanumeric characters that may include one or multiple non-alphanumeric characters.

Core Text Dictionaries are preferably supplied in optical format and physically transported to the remote node.

The invention allows for any means of coupling, part at least, of said dictionaries:

- to the means of creating (in part at least) a compressed version of said text and/or
- to the means of restoring (in part at least) a decompressed version of said text.

Part at least of compressed information may be encrypted. This may use, in part at least, the method and or apparatus of trusted systems as described in the previously described disclosed documents.

### **3) Image Data Reduction Means (IDRM).**

A significant component of Internet bandwidth is used in the transfer of image information. Another non-limiting objective of the present invention is to reduce the amount of data used to transfer images on the Internet. This means may include a Common Image Index, wherein the naming of images is formalised to improve use of image caches, and an Image Building Protocol, wherein information to construct images is sent to remote nodes instead of and/or in conjunction with actual image information.

The majority of Internet images are presently transferred in compressed format. The usual compressed formats expected by browsers are GIF (eg blueball.gif) and JPEG (eg redsquare.jpg).

The present invention preferably provides a means for servers to recognise whether or not a requesting remote node is compliant with the means of the invention. A means is preferably provided for compliant nodes to recognise that a particular file/image uses one at least means of the invention (and as such may require additional processing at the remote and/or other locally coupled nodes). It is also preferable that non-compliant nodes can also access the image files. The preferred embodiment includes a compliance identifier in the file name (eg \_idrm (copyright 1999 to John Griffiths), to indicate the file/image is compatible with IDRM of the invention). The compliance identifier is preferably located prior to the tag (eg. .jpg, .gif) in the image filename. For example, the file name of a green square may be represented as greensqr\_idrm.jpg. Non-compliant nodes would usually see this image as a JPEG file of an image called greenSqr\_idrm and handle it using the known art of browser (and/or any other) means. The server and/or one at least downstream nodes (eg. ISP) preferably ensure that the image is in a standard format suitable for use by non-compliant nodes. A compliant node preferably parses file names looking for the \_idrm identifier. If absent, the file is preferably treated as for the known art. If present said

compliant node preferably performs further processing to generate the image. For compliant file names, the file tag (eg .jpg, .gif) may be irrelevant. The invention allows for any means to describe the image. Multiple means may be used for one at least images. The preferred embodiment includes a description of the means within the image information. The preferred embodiment of the invention has a server means capable of delivering the image in a format suitable for non-compliant nodes and another format suitable for compliant nodes. The preferred means of informing a server (and or any other upstream node) that a remote node is compliant is to change the compliance identifier from \_idrm to \_idrm\_1 (© 1999 John Griffiths), when a file is requested.

For example, a web page may include a reference to an image greensqr\_idrm.jpg. A non-compliant node would send a request for this image and preferably receive it in a format compatible with the known art. A compliant node preferably modifies the filename, sending a request for greensqr\_idrm\_1.jpg. Said compliant node preferably receives sufficient information to construct the image and said information is preferably less than that transferred as greensqr\_idrm.jpg to non-compliant nodes.

Images that are compliant with the invention may be named using one at least Common Image Index Means (CIX) (see below) and/or one at least Image Building Protocol (IBP) Means. It is preferable that a means is provided to indicate to remote nodes if one at least images includes one or both of CIX, IBP. The preferred embodiment replaces \_idrm with \_idrm\_c if the image is named using the CIX means, and \_idrm is replaced with \_idrm\_b if the image uses the image building means. The preferred embodiment replaces \_idrm with \_idrm\_a if CIX and IBP are used.

In the case of the green square example, the web page may include an image reference to:

- greensqr\_idrm\_c.jpg if it follows CIX protocol and does not use IBP. Non-compliant nodes preferably request the file greensqr\_idrm\_c.jpg. Compliant nodes preferably request the file greensqr\_idrm\_c\_1.jpg (the \_1 indicating a compliant node);
- greensqr\_idrm\_b.jpg if it follows IBP and does not use CIX. Non-compliant nodes preferably request the file greensqr\_idrm\_b.jpg. Compliant nodes preferably request the file greensqr\_idrm\_b\_1.jpg (the \_1 indicating a compliant node);
- greensqr\_idrm\_a.jpg if it follows IBP and CIX. Non-compliant nodes preferably request the file greensqr\_idrm\_a.jpg. Compliant nodes preferably request the file greensqr\_idrm\_a\_1.jpg (the \_1 indicating a compliant node);

Practical embodiments of the invention may also include other \_(extensions) within the file name eg. greensqr\_(extensions)\_idrm\_c.jpg. Extensions are described in detail later in the specification. Image names preferably include a **descriptive handle** (eg. greensqr, blue\_ball), a **file tag** (eg. jpg, gif, any other file type) and a **compliance indicator** (eg \_idrm, indicating compliance with the image data reduction means).

### 3a) Common Image Index (CIX).

The known art does not describe a coherent system for the naming and indexing of image information across websites and servers despite the fact that many different web addresses use the same commodity images. Well-organised websites may create an image folder such that identical images are used by multiple pages within that website, however, the ISP and/or end user are likely to be caching multiple copies of the same image (under the same an/or different names) in their caches. They are also likely to be downloading an image from website x (x

1 may be any site) when they have previously downloaded one or multiple copies of the image from one at least  
2 other sites. The Common Image Index seeks to minimise repetitive downloading of previously cached images.

3  
4 The invention describes an **absolute image index** that is controlled by one at least predetermined image clearing  
5 houses and a **relative image index** that may be created by local entities (non-limiting examples including:  
6 multiple website hosts, ISP caches, end-user caches). Moreover, the invention seeks to describe a means that  
7 permits non-compliant nodes to receive image information as per the expected norm.

8  
9 **3.a.i)** The **absolute image index** preferably allocates a unique name (preferably alphanumeric) to images  
10 submitted (and/or in any other way obtained) for absolute indexing. Absolute indexing is preferably performed by  
11 one at least image clearing house (that may have multiple geographic locations and/or multiple net Internet ID  
12 addresses). Said clearing-house preferably maintains a database of all submitted images and allocates a unique ID  
13 to each image. When a new image is submitted for indexing a search is preferably made of the existing image  
14 database to verify that the image is not already catalogued. This would usually involve comparing part at least of  
15 each image file previously indexed with the image file to be indexed.

16  
17 The preferred method of providing remote nodes with image information is to provide high performance Internet  
18 pipes directly to the image database maintained by the image-clearing house. This contrasts to the present art  
19 wherein each website is the source of image information. The invention allows that images provided under the  
20 absolute index means may be sourced from any means with non-limiting options including common image  
21 databases maintained by web hosts, ISPs. Individual websites may continue to source absolute images.

22  
23 In addition to the online sources of absolute indexed images described above, it is anticipated the pending mass  
24 uptake of Digital Video Disc (DVD) will allow remote nodes (eg. end-users) to have large libraries of absolute  
25 indexed images on high capacity optical media (eg. CD ROM, DVD, any future optical and/or physically  
26 portable technologies). The optical media may be read only and/or read/write.

27  
28 The preferred method of naming image files under said absolute indexing means is to include:

- 29       • a unique identifier (eg. \_AAAAAA0000001), and  
30       • an absolute index identifier (eg. \_aix),  
31       in the extensions field of the image file name.

32  
33 For example the image of a green square may be identified as:

34 greensqr\_(AAAAAA0000001\_aix)\_idrm\_c.jpg. The \_aix is preferably a reserved symbol and not used in the  
35 name of images that do not use AIX.

36  
37 It is also preferable that the web page reference to the image includes an absolute IP address directing it to the  
38 image source.

39  
40 In a system where AIX images are sourced from one at least central servers, it is preferable that a means exists to  
41 provide redundancy in case of server failure. The preferred embodiment allows that compliant remote nodes may  
42 be provided with two at least IP addresses (preferably at different physical locations) constituting the first and

1 second source choice, for non-local AIX images. The AIX image servers for a particular remote node, are  
2 preferably those servers in closest geographical proximity to said remote node. The remote node would normally  
3 request an image from the first choice and if not delivered within a predetermined time it may request the image  
4 from the next choice, etc.

5  
6 The invention allows that non-compliant nodes may need to source images from the website server providing the  
7 web page the image is to be displayed within (the usual method with the current art). The preferred method is for  
8 the web page server to re-send the request to the image server (eg at the image clearing house). The preferred  
9 means of returning the image to the requesting remote node (eg. user) may include as non-limiting examples:

- 10 • the image server transferring the image to the web-server, that sends it to the requesting node with the  
11 webpage server ID returned in the IP packet (as expected by the receiving node).  
12 • the image server sends the image directly to the requesting node with the image server ID in the IP packet.  
13 • the image server sends the image directly to the requesting node with the image server ID replaced by  
14 webpage server ID in the IP packet.

15  
16 When an end-user wants to access a webpage, the webpage is usually accessed from the Internet and/or from  
17 local caches. The known art usually checks the contents of the webpage for references to image files that are part  
18 of the page (and/or used for any other reason). Local caches may be examined for the named image. This may be  
19 used if present. A request may be sent for the image to be downloaded from a remote source. This may be from  
20 an image cache at the end-user's ISP and or other end-users coupled to said ISP and/or any other Internet nodes.  
21 In many cases the image is sourced directly from the webpage server.

22  
23 The known art usually caches information for separate websites in a file structure that separates the contents of  
24 different websites. For example when website A (where A may be any name) is cached, it may be stored in the  
25 cache in a folder identified as Website A. The Website A folder may have multiple sub folders that may be  
26 arranged in any hierarchical (and/or other means) structure. The structure usually reflects the structure used to  
27 store website A on its server. Within Website A folder, one at least sub folder is preferably an Images folder that  
28 stores part at least of the images used by Website A. When a webpage is designed it preferably accesses images  
29 from the linked image folder. For example, a webpage may include a reference to an image called  
30 example\_image (where example\_image may be the name of any image). This may be identified as being located  
31 at: www.websiteA/images/example\_image. Locations that this image may be fetched from may include the  
32 images folder at the worldwide address websiteA, and/or an images folder in a websiteA folder in a user cache  
33 and/or ISP cache. The image may also be located in the same folder as the webpage, in which case it may be  
34 identified as example\_image.jpg. The image may also be stored in any other folder. It is also possible that the  
35 webserver and/or one at least remote node caches stores a copy of example\_image in the images folder and one at  
36 least other folders within the websiteA folder.

37  
38 When a cache is checked for the presence of one at least images, the known art checks for the presence of the  
39 image in the designated folder. It is possible that the image is already cached in a folder within the websiteA  
40 folder (and/or elsewhere), however, if it is not within the designated folder, the image may be re-downloaded  
41 from an external source (eg. the webpage server). This is a waste of bandwidth.

For example, in a user cache the websiteA folder may include a folder identified as webpageA\_example that includes a copy of the webpage identified as webpageA\_example. The webpage, webpageA\_example may reference an image that it expects to find in folder webpage\_A, however, this image may not be present in the cache in this location. The user node would usually then attempt to access example\_image from an external node. This is usually from the webpageA folder stored on the websiteA server. It may also be accessed from an intermediate node. For example the user's ISP may have example\_image cached in its own cached version of the webpageA folder. This process may be despite the fact that example\_image may already be stored in the images folder within the websiteA folder in the user's cache (eg. from a page access to websiteA that references example\_image in the images folder). It is also possible the multiple different images are stored within different folders within folder websiteA using the same name.

In addition to example\_image being found in multiple folders within the folder websiteA, it may also be located within one at least other folders within a user/ISP cache that cache other websites (and/or any other files), for example websiteB (that may represent any website name). For example, folder websiteB may include a folder webpageB\_example that includes webpageB\_example. The latter may reference example\_image in the images folder within folder websiteB (this is usually a different images folder to that described for the websiteA folder). When the browser (and/or any other means) is displaying webpageB\_example and needs to access example\_image it would usually check the images folder in the websiteB folder and if not present, make an external access. This may be despite the fact that example\_image is within another website cache (eg the folder websiteA).

The known art may result in an inefficient method of caching images that may result in multiple replication of images in caches and the need to make external accesses to images that are already cached one at least times. The present invention seeks to overcome these deficiencies, in part at least.

The preferred embodiment allows that images, in particular images that may be used by multiple websites, are allocated a preferably unique ID means (eg. filename), for example, as previously described for the absolute image index. It is preferable that these absolutely indexed images are stored at known locations that are preferably optimised to minimise duplication of image transfers.

For example, one at least image servers may provide images for a large number of websites and/or web host sites. This may minimise the unnecessary duplication of the same image across multiple web host sites and/or multiple websites with the same web host and/or any other servers.

It is also preferable that ISP and/or user (and any other remote nodes) caches are optimised such that absolutely indexed images are stored in one at least locations accessible by a web pages from a plurality of websites. Non-limiting examples may include:

- an optical storage means coupled to the user node and/or ISP node. For example, absolute indexed images may be supplied as libraries on optical media (eg CD-ROM, DVD). User's may have part at least of this library and/or their ISP may have part at least of the library.

- a writeable storage means (eg, magnetic disk, writeable optical media, semiconductor memory) for caching images loaded via the Internet.

When a webpage references an image that may be identified as absolute index compatible, the preferred embodiment has the browser and/or any other locally coupled means first access one at least AIX caches at the remote node (eg, coupled to a user's node). If the image is not present in one at least user caches, said means preferably requests the ISP to check its caches and/or caches of other customers of the ISP. The next step may be to check one at least central image servers. The invention allows that AIX images may be accessed on any one at least nodes on the Internet (eg, the webpage server). This arrangement may be configured such that a user (and/or ISP) preferably only caches one copy (or a minimal number) of a particular image.

The preferred method to identify AIX images is to have a software means parse the image file names looking for `_aix` in a preferably predetermined location.

Remote nodes that are not compliant with the invention preferably continue to access AIX images using known means.

**3.a.ii) Relative Image Index (RIX).** The invention also allows that there may be a need for a coherent means of naming images that is not as specific as the AIX means and that preferably does not rely on a centralised indexing means. These are referenced as relative indexed images and are intended to provide a means of minimising unnecessary image transfers using a cataloguing means that is preferably local, in part at least, to one at least nodes on the Internet. The index names are preferably unique to that particular node, however, they may not be unique across different nodes and the same image may exist at different nodes under different names.

As with AIX images, RIX images are preferably provided with a new name if there are any changes to the image.

The preferred method of naming image files under said relative indexed images is to include:

- a relatively unique identifier (eg `_AAAAAA0000001`),
- a relative index identifier (eg `_rix`),
- the node ID that the images are relatively unique to,

in the extensions field of the image file name.

For example the image of a green square may be identified as:

`greensqr_(AAAAAA0000001_nodeID_rix)_idrm_c.jpg`. The `_rix` is preferably a reserved symbol and not used in the name of images that do not use RIX.

Relative image indexing may be better understood by way of an example of a typical application:

A particular example `_webhost` (that may represent one at least, any webhosting facility) may provide website services for `x` websites (`x` may be any number). Said example `_webhost` may provide an image indexing service for one or multiple website customers.

- It is preferable that each RIX provider is given a unique image index node ID that preferably is included in the image name of images indexed by said RIX provider.
- In the preferred embodiment part at least of the images referenced by one or more websites located at said webhost are given an ID that is unique to that webhost.
- RIX images are preferably located on an images server means local to said webhost (the images may, in part at least, be located anywhere).

When a web page is loaded onto one of the servers controlled by said example\_webhost, it is preferable that a means at said example\_webhost examines references to images within said page.

- one at least image names referenced by the webpage may use an AIX and/or RIX means and/or one at least any other type of image naming system (for example the known art of image naming for webpage images).

The preferred embodiment examines non-AIX/RIX images and compares them to the existing database of RIX images (it may also compare images to a database of AIX images, however, said database may not be as comprehensive as the central database of AIX images).

- If an image matches an existing database image, the image name within the webpage is preferably changed to that of the relevant RIX image in the database.
- If the image is new to the database, a new RIX compatible image name is preferably created and the image name in the webpage suitably adjusted.

Changing the webpage image name is preferably done before the webpage goes live (for example, to prevent two versions of the image name existing in cyberspace).

The invention allows that a RIX image name may be changed to an AIX and/or a non-AIX/RIX image name changed to an AIX name by any means including means located at said example\_webhost.

A means is preferably located at said example\_webhost that intercepts remote node requests for access to AIX/RIX images from particular websites and sources the image from the RIX server (usually locally) and or redirects to an AIX server (as previously described). The IP packets returned to the requesting node are preferably suitably modified to meet the expectations of the requesting node. These requests would usually be from non-compliant nodes (usually from a browser having difficulty with an embedded absolute image address). Compliant nodes preferably direct requests for images directly to the appropriate servers.

It will be appreciated by those experienced in the art that the construction and maintenance of an absolute image index is a major undertaking. The invention allows that relative indexing means operating at various nodes may be used to assist with the development of the absolute image base. For example, a webhosting facility may index a large number of images into RIX mode. This reduces the number of raw images that need to be examined by a central image indexing means. Furthermore example\_webhost may compare RIX images with AIX databases and rename RIX images to the appropriate AIX name, further rationalising the development and maintenance of the AIX database.

1 It is preferable that example\_ webhost maintains a database of converted image names and is able to deliver an  
2 AIX version of the image when a request is made for the RIX version. This will usually only occur when pages  
3 have been distributed to cyberspace with the RIX name prior to conversion to the AIX name.

5 When a non-AIX/RIX image name is released to cyberspace prior to conversion to an AIX/RIX format, it is  
6 preferable that a cross-reference is maintained for requests for the earlier image name.

8 In an ideal situation all of the images at example\_ webhost exist as AIX and/or RIX names. however, the  
9 invention allows for any percentage of the images to exist in non-AIX/RIX formats.

11 The processing of RIX images by end user/ISP nodes may be more complex. A particular example\_ webhost may  
12 have a limited number of images that it may need to index and it need only provide a name unique to that node.  
13 ISP's and end-users (as non-limiting examples) may be retrieving images from multiple physical sites. They may  
14 receive an image from one site that uses the known art, the same image from another site using AIX means and  
15 the same image from multiple other sites with different RIX names. The invention allows for any means to  
16 rationalise these images at nodes remote from the server of the image(s).

18 It is preferable that end-user compliant nodes include a means to examine image references in incoming and/or  
19 cached web pages (preferably all pages).

21 It is preferable that end-users maintain an AIX cache means. AIX images that are not present in portable cache  
22 means (where used) are preferably stored in a writeable cache means.

24 It is preferable that end-users maintain an RIX cache means. While the invention allows that RIX images may be  
25 distributed to users on portable media, they will usually be stored in a dynamic cache means coupled to said end-  
26 user means and loaded to said cache from the Internet.

28 It is preferable that the end-user maintains:

- 29 • a RIX cache means (RIX\_cache\_ext) for images loaded from external nodes as
- 30 RIX compatible images, preferably with a corresponding webpage reference to
- 31 the RIX image
- 32 and
- 33 • a RIX cache means (RIX\_cache\_user) for images loaded as non-AIX/RIX
- 34 formats and converted to a user RIX format (as described later).

36 It is preferable that end-users maintain a non-AIX/RIX cache means, referenced as General Image Dump (GID).

38 It is preferable that all cached images are stored in one at least of AIX, RIX and/or GID and/or other cache means  
39 described for the invention.

41 It is preferable that images are deleted from other cache locations.



1 The preferred embodiment of the invention preferably guarantees that AIX and RIX images are stable over time.  
2 Any change to these images is preferably reflected in a new name. This may allow the user to perform useful and  
3 reliable image cache rationalisation.

4

5 In contrast images loaded under other naming formats may be subject to unpredictable change. For example, the  
6 image name may be changed at a website with no content change. The image content may be changed with no  
7 name change. This may limit the user's options in local image cache rationalisation.

8

9 It is preferable that end-user nodes include a means to examine incoming and/or cached RIX images and compare  
10 them with images in the AIX cache. It is preferable that images that match AIX images have their names changed  
11 to the corresponding AIX name. It is preferable that the matching RIX image is removed from the RIX cache. It  
12 is preferable that the RIX image reference in the corresponding web page(s) is changed to a reference to the AIX  
13 name. A non-exclusive option may be to leave the RIX image reference in the web page and provide a means that  
14 examines the UARLM (see next paragraph) for an equivalent AIX image name and a means for said AIX image  
15 to be fetched from the AIX cache

16

17 It is preferable that a database (or any other reference means) is maintained by the end-user node that cross-  
18 references RIX images with their corresponding AIX name. This cross-reference means is referred to as the User  
19 AIX/RIX Lookup Means (UARLM). It is preferable when multiple RIX names reference the same AIX that one  
20 RIX name is selected (usually the first one matched) as the entry in the UARLM and that other RIX names  
21 reference said selected RIX name in the UARLM and thus indirectly reference the AIX image.

22

23 It is preferable that end-user nodes include a means to examine incoming and/or cached RIX images and compare  
24 them with images in the RIX cache. It is preferable that images that match other RIX images have their names  
25 changed to the corresponding RIX name. It is preferable that the matching RIX image is removed from the RIX  
26 cache. It is preferable that the RIX image reference in the corresponding web page(s) is changed to a reference to  
27 the previously cached RIX name. A non-exclusive option may be to leave the RIX image reference in the web  
28 page and provide a means that examines the URRLM (see next paragraph) for an equivalent RIX image name  
29 and a means for said equivalent RIX image to be fetched from the RIX cache.

30

31 It is preferable that a database (or any other reference means) is maintained by the end-user node to cross-  
32 reference multiple RIX names representing the same image. This cross-reference means is referred to as the User  
33 RIX/RIX Lookup Means (URRLM).

34

35 It is preferable that references to RIX image(s) within a web page accessed by an end-user node are checked for  
36 availability from the:

- 37
- RIX cache(s), and/or
  - 38 • the UARLM is checked for a cross-reference for the RIX image in the AIX cache, and/or
  - 39 • the URRLM is checked for a cross-reference to another RIX image.

40

41 It is preferable the UARLM and URRLM are maintained even after the corresponding and/or cross-reference  
42 images may have been deleted from the various caches at the end-user node.

1  
2 It is preferable that end-user nodes include a means to cache non-AIX/RIX images such that the images used by  
3 multiple web pages and/or websites are accessible from one at least central repositories located at said end-user  
4 node. A non-limiting example of a central user repository is a cache means that stores images referenced by  
5 webpages sourced from multiple websites. One non-limiting example of said central repository in particular is  
6 where the filing of said images is not based, in part at least, on file structures dictated by the file structure of  
7 websites and/or webpages. The preferred central user repository is referenced as the General Image Dump (GID).  
8 Non-AIX/RIX images are preferably dumped in the GID together with a tag indicating the name, and/or the  
9 source and/or the validity date of the image(s) (eg www.gatecrashers.com/nanohard.jpg, last update 12 March  
10 1999). When a browser and/or any other means attempts to load an image from the net, a means is preferably  
11 provided that checks the GID for the image name and address. The means preferably determines if the image is  
12 still current on the server (eg. by checking the date of last update at the server) and if valid uses the image in the  
13 GID. If invalid it may source a valid copy of the image from relatively local means (eg ISP cache, other end-user  
14 nodes) and/or from the image server and/or any other means.

15  
16 The GID may contain multiple copies of the same image and/or images that are already present in AIX and/or  
17 RIX caches. It is preferable that the end-user node includes a means to rationalise the GID. The preferred means  
18 uses a user controlled RIX cache means (RIX\_cache\_user) with each image uniquely named for that user system.  
19 Those experienced in the art will be able to adapt means described for AIX and/or RIX names to achieve this  
20 outcome. The preferred embodiment checks the images in the GID (preferably by a content search) and compares  
21 them with images in RIX\_cache\_user. Matching images in the cache are preferably deleted and cross-referenced  
22 in a User/User RIX lookup Means (UURLM). This preferably uses similar processes for cross-reference means  
23 described for UARLM/URRLM. When the browser and/or any other means searches for images in the GID, it  
24 preferably checks the UURLM for the image name and address and if present sources the image from  
25 RIX\_user\_cache. It is preferable that a means is provided to verify the image in the cache is valid compared with  
26 that currently on the server (eg. using the means described for validating GID images). If the GID contains  
27 images that are not in the RIX\_cache\_user, said image is preferably given a user RIX name and stored in the  
28 RIX\_cache\_user. The original image name is preferably cross-referenced to the RIX name in the UURLM.

29  
30  
31 **3b) Image Building Protocol.** In addition to describing a means to minimise the transfer of redundant image  
32 information as described under Common Image Index, the invention also seeks to describe a means to reduce the  
33 amount of information transferred per image.

34  
35 **3.b.i) Partial Image Transfer.** The invention allows that when an image is changed, it may include information  
36 previously transferred to one at least remote nodes. Those experienced in the art will be able to adapt the means  
37 previously described for partial file transfers to partial image transfers.

38  
39 **3.b.ii) Image Construction Means.** The invention seeks to take advantage of the fact that many images  
40 transferred on the Internet are computer generated, in part at last. Typical non-inclusive means used to generate  
41 images are paint programs and 3D modeling programs (eg. ray tracing, polygon methods). The known art  
42 typically generates an image that may use computer means and subsequently transfers this image to a server for

1 distribution via the Internet. When a remote node downloads the image from the server, it usually receives the  
2 actual image in a compressed format (eg. GIF, JPG). However, the actual number of user instructions (eg,  
3 keystrokes, mouse movements, mouse clicks, wire frame co-ordinates) required as inputs to an image generating  
4 means can usually be represented by much less information than that used to represent the final image. The  
5 invention seeks to describe a means wherein the commands used to create an image are recorded and  
6 subsequently transferred to one at least servers for distribution via the Internet, preferably instead of transferring  
7 actual image information. The node that will display the information preferably reconstructs the image from the  
8 information received. The invention allows that any one at least intermediate nodes may reconstruct the image, in  
9 part at least. Said intermediate nodes may transfer (preferably in compressed format) said reconstructed image, in  
10 part at least, to one at least downstream nodes.

11

12 When a compliant node detects an image file name that indicates said file uses the image building system, eg.  
13 greensqr\_idrm\_b.jpg, a means is preferably provided that creates the image(s) from the information within the  
14 relevant image file.

15

16 The preferred embodiment allows that one at least remote nodes includes image creating means that are  
17 equivalent to and/or able to emulate the image creating means used to initially create the image. A non-limiting  
18 solution is to include a standardised paint program and/or ray tracing program and/or polygon generating means  
19 at each remote node and at means used to originally create images.

20

21 The preferred embodiment tracks, in part at least, the input means (eg key presses, mouse movement, mouse  
22 clicks) used to instruct the image generating means that creates the original image. The are preferably recorded in  
23 a predetermined format and transferred to one at least servers and/or remote nodes for subsequent regeneration of  
24 the image by applying said record of input means to one at least image generating means at said server and/or  
25 remote nodes.

26

27 The invention allows for any means that minimises the number of recorded steps - for example multiple mouse  
28 movements may be collated into one at least reference co-ordinates at which one at least actions occurs. For  
29 example, when using a paint program the brush may start at the origin and be moved (eg. via the mouse) until it  
30 reaches a desired x,y co-ordinate. Instead of recording all the mouse movements, it is preferable that only said x,y  
31 is recorded. At this point an action may be initiated (eg. create a square) that is preferably recorded. The mouse  
32 may then be dragged to the end-point of the square. It is preferable that this end-point is recorded and not the  
33 intermediate mouse movements. At said end point another action may be initiated (eg. draw square) that is  
34 preferably recorded. Another action may be to select a colour (eg. green) and/or gradient fill (eg dark in centre of  
35 square to light at the boundaries) and/or flood fill the square. The result may be a green square with a gradient  
36 colour fill represented by thousands of shades of green. The image may consist of multiple thousands of bytes,  
37 however, it may be represented by a small number of bytes in the form of instructions to a paint program (for  
38 example).

39

40 Another non-limiting example may track the creation of a wire frame used as input to a polygon generating  
41 means.

42

1 The invention allows that equations may be used to represent part at least of an image.

2

3 The following non-limiting example may be used, in part at least, to describe an image building means. The  
4 invention allows for the construction of simple images and the construction of complex images from a plurality  
5 of simple images that, in part at least, are generated by an image construction means. The image construction  
6 means of the present invention is a means that unlike the known art, includes more than the decompression of  
7 compressed image information to create digital information suitable for use in a display means.

8

9 **A) Construction of Simple Images.**

10

11 **Image\_Size.** This is preferably expressed as the number of pixels (eg x60y80, for an image of width 60 pixels  
12 and height 80 pixels). While the preferred embodiment contains images within a rectangle (or square) any  
13 bounding means may be used (eg. circle, ellipse, triangle).

14

15 **Image\_Background.** This describes the background colour of the image, preferably as a 24 bit colour. The  
16 preferred coding system has red represented by the first 8 bits, green by the second 8 bits and blue by the last 8  
17 bits. The invention also allows that a range of colours may be used to represent the background, for example,  
18 \$000000-00007F would have all pixels with no red and green component and a blue component \$00-\$7F as the  
19 background colour.

20

21 **Image\_Transparency.** This is preferably used to control the behaviour of the image background. As non-  
22 limiting examples, a value of 0 may result in the background colour being displayed as designated. A value of 1  
23 may indicate that the colour is transparent to underlying graphics (eg. the web page behind may show through).  
24 When an image is a composite of multiple images (as described later), a value of .2 (for example) may indicate  
25 that said background is transparent to underlying images.

26

27 **Image\_Translucency.** This is preferably used to control the translucency of the image. For example a value of 0  
28 may indicate that the image is solid with no translucency to underlying images, a value of \$FF would result in the  
29 object not being seen. Intermediate values preferably blend (to varying degrees) the image with underlying  
30 images. The invention also allows that images may have a variable translucency means. Said variable  
31 transparency is preferably defined as string of subunits, wherein each subunit defines a degree of transparency  
32 (**trans\_degree**) and the period of time said level of transparency applies (**trans\_time**). For example, the sequence  
33 00/05, 10/05, 20/05 may indicate that the transparency is 0 for 5 video frames, \$10 for 5 frames and \$20 for a  
34 further 5 frames. The invention allows that the sequence may be any length. The sequence may be repeated from  
35 zero to infinite times at one or multiple intervals. Any default is allowed for when the sequence is no longer  
36 cycling. The **sequence\_terminator** preferably describes the behaviour at the end of a sequence. For example  
37 00\_00 may indicate the sequence recycles indefinitely. FF\_FF may freeze the image at the endpoint of the cycle.  
38 FF\_00 may freeze the image at the start of the sequence. 10\_XX may sequence the image on a variable basis.  
39 wherein XX may represent any string that defines the delay between each run of the sequence.

40

41 **Dynamic\_Flag.** This is preferably used to indicate whether the image is static (eg a blueball is statically  
42 displayed) eg. flag set to zero or if the image has a dynamic component, eg the flag set to 1.

If the dynamic flag is set, the invention allows for any means to further define the dynamic nature of the image.

Non-limiting examples may include:

- a means (eg **ray\_trace**) to indicate that the image is the result of the preferably realtime output of a ray tracing means. This preferably includes a means (eg **refresh\_period**) to indicate how often the image should be refreshed. This is preferably expressed as video frames. For example **ray\_trace** may be represented by the value 1 and if the image is to be updated every second frame, the value of **refresh\_period** may be 2.
- a means (eg **polygon**) to indicate that the image is the result of the preferably realtime output of a polygon generation means. This preferably includes a means (eg **refresh\_period**) to indicate how often the image should be refreshed. This is preferably expressed as video frames. For example **polygon** may be represented by the value 2 and if the image is to be updated every second frame, the value of **refresh\_period** may be 2.
- a means (eg **anim**) to indicate that the image is animated using a sequence of images. This preferably includes a means (eg **image\_number**) to indicate how many images are required for the animation. It preferably includes a means to indicate the sequence that the images are displayed in (eg **image\_sequence**), eg 01,02,03,04 may play a four image animation in sequence, whereas, 01,02,03,04,04,03,02,01 may play the animation in sequence and then reverse the sequence. It preferably includes a delay means (**image\_delay**) that indicates how many video frames (or any other reference) each image is displayed for. It preferably indicates a means (**repeat\_info**) to describe the behaviour of the animation on completion of the sequence. Those experienced in the art should be able to adapt the means described for sequencing translucency to the sequencing of animations.
- a means (eg, **live\_feed**) to indicate that the image is a live feed eg, broadcast TV that is captured using means described later in this specification. This preferably includes a means (eg, **source\_indicator**) to indicate the source of the image.
- a means (eg, **net\_refresh**) wherein the image needs to be refreshed at periodic intervals from the Internet and/or one at least local caches. This preferably includes a means (eg, **net\_period**) to indicate how often said refresh occurs.

**Image Type:** a means (eg, **type**) to indicate special types of images. Non-limiting examples may include **\_text** (wherein the image is a box displaying text), **\_scroll up** (an object that may be used to scroll text up) and other text manipulating objects.

**Reference Image Name:** a means (**image\_ref\_name**) to indicate the constructed image name. In the case of an animation sequence it may include the name of the frames that comprise the animation. In the case of complex

1 images (described below) that are constructed from multiple other images (that may also be constructed images)  
2 the file name may be that of the complex image.

3  
4 **Object Image Name:** the invention allows that an existing object may be fed into the image construction means  
5 and manipulated to produce one or at least other images. For example, blue\_ball may be supplied to the image  
6 construction means and the blue pixels replaced by green pixels to produce a green ball. The  
7 **image\_object\_name** in this non-limiting example is blue\_ball and green\_ball may be the image\_ref\_name of the  
8 constructed image. The object represented by image\_object\_name may itself need to be constructed.

9  
10 **Construction Means:** a means (eg. **image\_builder**) to indicate the image construction means required to  
11 generate the image(s). Non-limiting examples may include:

- 12 • **\_ka\_jpg** for a known art jpg image (no processing usually required apart from known art  
13 decompression),
- 14 • **\_ka\_gif** for a known art gif image (no processing usually required to create image apart  
15 from known art decompression),
- 16 • **\_aix** for an absolute indexed image (no processing usually required to create image apart  
17 from decompression where applicable),
- 18 • **\_rix** for an absolute indexed image (no processing usually required to create image apart  
19 from decompression where applicable),
- 20 • **\_colourburst** for an image that is created, in part at least, by applying the information in  
21 **construct\_sequence** to a preferably standardised paint means. This may use (preferably  
22 standardised) hardware graphics engines.
- 23 • **\_lightsculpt** for an image that is created, in part at least, by applying the information in  
24 **construct\_sequence** to a preferably standardised ray tracing program. This may use  
25 (preferably standardised) hardware graphics engines.
- 26 • **\_lightspeed** for an image that is created, in part at least, by applying the information in  
27 **construct\_sequence** to a preferably standardised polygon generating means. This may  
28 use (preferably standardised) hardware graphics engines.

29 The invention allows that pre-constructed (in part at least) images, eg **\_ka\_gif**,  
30 **\_aix**, **\_rix**, **\_ka\_jpg** that are loaded into the image construction means may  
31 themselves require at least one pass through their own image constructing  
32 means to generate the required image. For example, a blue ball may be  
33 converted to a green ball using the image construction means described above.  
34 The blueball used as input may be a ready to use image (eg jpg) or it may itself  
35 be defined by a set of commands for use in an image construction means prior  
36 to use as part of a second image construction process.

37  
38 **Image Construction Instructions:** a means (eg. **construct\_sequence**) that directs said image builder to  
39 construct an image. For example move cursor to x1,y1; start square, drag square to finish point at x2,y2. The  
40 **construct\_sequence** may define a series of images, for example, to create an animation sequence.

- 1 **Special Effects:** a means (eg. special effects) to apply additional processes to images processed by said image  
2 constructing means. Non-limiting examples may include:
- 3 • changing part at least of the pixel colours in an image (eg. replace the various shades of blue in an image  
4 with green to change a blue ball to a green ball),
  - 5 • expand or compress part at least of an image,
  - 6 • perform mathematical operations on part at least of an image, eg cause water to shimmer. Said part at least  
7 of the image may be defined by any means, non-limiting example include delimiting a part of the image by  
8 the x,y co-ordinates of the image, and/or defining a certain colour(s) pixel(s),
  - 9 • make an image flash (eg. construct an animation sequence wherein part of the frames have no image,
  - 10 • description of means to input text into a text image (eg a web address that sources the information. Said  
11 source may be dynamically updated)

12

13

14 **B) Construction of Complex Images.**

15 The construction of an image at a remote node may be a simple image as described above. The image may also  
16 be more complex consisting of a plurality of simple images, each of which may include the means described for  
17 simple image construction and/or any other means of image generation.

18

19 **Canvas\_Size.** This is preferably expressed as the number of pixels (eg x230y300), for an image of width 230  
20 pixels and height 300 pixels). While the preferred embodiment contains images within a rectangle (or square) any  
21 bounding means may be used (eg. circle, ellipse, triangle). This preferably defines the image display area  
22 available to incorporate all the simple images that are part of said complex image. The invention allows that a  
23 means may be includes to define where the actual image is displayed within a web page and/or any other means.

24

25 **Number\_Images.** Preferably a hex number indicating the number of simple images within the canvas. This may  
26 be any number greater or equal than one.

27

28 **Canvas\_Background.** This describes the background colour of the canvas, preferably as a 24 bit colour. The  
29 preferred coding system is as described for Image\_Background earlier.

30

31 **Canvas\_Transparency.** This is preferably used to control the behaviour of the canvas background. As non-  
32 limiting examples, a value of 0 may result in the background colour being displayed as designated. A value of 1  
33 may indicate that the colour is transparent to underlying graphics (eg. the web page behind may show through).  
34 In the preferred embodiment the simple images follow the attributes defined as previously described eg.  
35 transparency, translucency.

36

37 **Canvas\_Translucency.** This is preferably used to control the translucency of the canvas. For example a value of  
38 0 may indicate that the image is solid with no translucency to underlying objects (eg web page). a value of \$FF  
39 may result in the object not being seen. Intermediate values preferably blend (to varying degrees) the image with  
40 underlying images. The invention also allows that images may have a variable translucency means. The invention  
41 allows for any, one at least, transparency means described for images to be applied to the Canvas\_translucency  
42 means. Part only of the canvas may be given transparency/ translucency (and/or any other) attributes.

1  
2 **Image\_Co-ordinates.** A means to describe the location within the canvas of each simple image. The preferred  
3 embodiment allocates an x,y co-ordinate of 0,0 to the bottom left hand side of the canvas. Each image is  
4 preferably allocated an x,y co-ordinate within the canvas that the bottom left position of each image is located at.  
5 The invention allows that only part of any one at least images may appear on the canvas. This may use negative  
6 co-ordinates. The preferred means lists each simple image co-ordinate in the sequence they appear in the  
7 Image\_list (see below).

8  
9 **Image\_List.** A means to track the simple images in said complex image. The preferred embodiment uses a list of  
10 the reference\_image\_name for each simple image. The invention also allows for any means the allows the  
11 priority of images within the canvas to be determined (for example to determine which Image(s) appear in front  
12 of others when plural images occupy the same area of the canvas. The preferred means list the lowest priority  
13 image (ie. the one closest to the canvas) first in the Image\_List and the foremost image last in said Image\_List.

14  
15 The invention allows for a buffer means that stores component images (that may include duplicates of the same  
16 image) during the construction of a complex image).

17  
18 The invention allows that the means described for the present invention may be used to output images in a format  
19 suitable for use with the known art of browser design. The means of the invention may also be to used with any  
20 other means, that may include those described in this specification and other specifications incorporated by  
21 reference.

22  
23 Whereas the known art usually supplies an image in a standard compressed format eg gif, jpg from a server  
24 means to a remote node means, the present invention describes plural methods of reducing this image into  
25 component parts. Said component parts can preferably be digitally described with fewer bytes than used when  
26 the actual digital representation of each pixel and/or groups of pixels in an actual image is compressed. For any  
27 particular image quality using know compression methods, the means of the invention preferably provides a more  
28 compressed version. As the means of the invention may not be standard with known display (eg browser) means,  
29 a means may be required to transfer images in browser compatible format. Non-limiting means to achieve this  
30 may include adapting known browsers (and/or creating compatible browser) to include part at least of the means  
31 of the present invention. Disadvantages of this may include the need to significantly rewrite existing browsers.  
32 Another downside is that browser usually run under the host operating system, are written in high level languages  
33 and may have degraded performance when performing the additional processing required by this specification.

34  
35 It is preferably that the insertion of images into webpages (and/or any other means) is transparent to the browser  
36 and/or any other display means. The preferred embodiment of the invention provides for a separate means that  
37 implement part at least of the means of the present invention transparently and/or independently of the browser  
38 means and preferably of the operating system means. This is referenced as the transparent\_internet\_processor  
39 means. In the case of images it is preferable that image information is written directly (direct\_image\_insertion) to  
40 the display means of a User Controlled Data Processing System (UCDPS). Said transparent\_internet\_processor  
41 may be implemented using one at least system processors. For example a means (preferably hardware) may be  
42 coupled to an UCDPS that interrupts the system processor and directs processing to the means of the invention.



1 This permits a means that runs unencumbered by the overheads of the system operating system. The preferred  
2 embodiment of the invention uses one at least processing means that are additional to the UCDPS system  
3 microprocessors to perform, in part at least, the means of the invention. Said processing means may be included  
4 within the package of one at least system microprocessors.

5  
6 Said transparent\_internet\_processor may produce images suitable for use by known browsers and transfer said  
7 images to said browser. The invention allows that images created using part at least of the means described for  
8 the present invention may be packaged into a format suitable for use by known means, eg supply to a browser  
9 means as gif and/or jpg images. In the case of animated images they may emulate any animation protocol (eg. gif  
10 animation).

11  
12 It is preferable that said transparent\_internet\_processor maintains control (in part at least) of images constructed  
13 using the means of the invention and inserts and/or overlays said images constructed, into web pages and/or any  
14 other means. One method couples a means to known browsers such that said transparent\_internet\_processor is  
15 aware of the display co-ordinates of web pages displayed on a UCDPS and knows the position(s) in the page that  
16 the images belong. An alternative is a means wherein said transparent\_internet\_processor can automatically  
17 determine the location of images on a UCDPS display means. For example, a web page may have an image  
18 (marker-means) that is a rectangular outline defining the position of an image. Said outline may be two pixels  
19 thick - the outer almost black (eg \$010101) and the adjacent pixels slightly lighter (eg \$020202). The fill in the  
20 rectangle may be one shade darker than white (eg \$FEFEFE). This combination is unlikely to represent any  
21 image in practical applications. Said image may be referenced in a web page as square\_X (where X may be any  
22 name compatible with the image reduction means of the present invention. When a non-compliant node requests  
23 this image it is preferably delivered a jpg or gif file containing the relevant image. When a compliant node  
24 requests the same image, it is preferably delivered an image in the format of the invention. The  
25 transparent\_internet\_processor preferably transfer the image of said marker means to a browser means. Said  
26 transparent\_internet\_processor (or any other means) preferably examines the graphics output means of the  
27 UCDPS looking for the image marker and overlays the actual image into the space. A means is preferably  
28 provided to monitor changes in position and or the overlay of other information on top of said marker\_means.  
29 One advantage of this process is that processes may be applied to the graphics that are not possible or difficult  
30 with the known art, in particular these processes may be applied without interfering with the normal browser  
31 functions.

32  
33 Another preferred embodiment of the invention provides a hardware transparent\_internet\_processor means that  
34 includes its own browser functions and overlays the browser output over the other display means of a UCDPS.

35  
36 The method of producing complex images described for the invention may also be used with any hardware means  
37 that stores graphic objects in multiple graphics buffers and dynamically combines image components during the  
38 display process. This may apply (as a non-limiting example) when said combines, occurs while a video frame is  
39 output to a monitor. It may apply (as a non-limiting example) when one at least objects may be moved around a  
40 display (eg. a video monitor) with no requirement to rewrite, in part at least, the display information of other  
41 objects. Said no requirement to rewrite may apply when said other object was previously overlaid by one at least  
42 objects that may be said moved around a display and is subsequently revealed in part at least. The invention, non-

1 exclusively, allows for the use of the overlay means described in pending WO 98/54672 by this inventor titled  
2 "Securely Metering Advertising in Data Processing Systems that in part describes a means of overlaying display  
3 information. The invention non-exclusively allows for the use of part at least of the means described in Microsoft  
4 Corporation US Patent 5745095, titled "Compositing Digital Information on a Display Screen Based on Screen  
5 Descriptors".

6  
7 The means of the present invention may be readily adapted to produce a browser means that is functional online  
8 and offline. The present information describes a means for delivery information from a plurality of sources -both  
9 local to the user and from servers. Said means may be adapted by those experienced in the art such that it  
10 emulates other online functions. The browser and/or other means local to the user may not be aware that the  
11 system is online or offline. The secure metering means described in WO 98/54672, WO 97/25675 and WO  
12 96/27155 incorporated by reference, provide a secure means for metering usage of commercial images that may  
13 be provided for use with the system and for monitoring advertising displayed to the user. This may apply when  
14 the remote node is online and/or offline.

15  
16 The addition of secure processing to the means of the present invention also provides a means of secure  
17 electronic commerce. Those experienced in the art will be able to adapt the means described in the documents  
18 referenced by incorporation to provide a system of secure electronic commerce to function with a UCDPS  
19 equipped with part at least of the means of the present invention.

### 20 21 **3c) Partial Image Distribution.**

22 The distribution of image information via the net, for example movies, pornography, casino games, consumes  
23 significant bandwidth. This information would be more effectively distributed on optical media. For example,  
24 one DVD-disc costing approximately one dollar and able to be sent to most places in the world by post may  
25 contain 17 gigabytes of data. At 64k (the best user data rate in common usage) this would take about 2 million  
26 seconds to download (approximately 700 hours). Most postal systems could deliver this in a few days. One  
27 reason the Internet is preferred is that it may circumvent government legislation banning certain material (eg.  
28 adult only information). This legislation is generally ineffective and congests the net. The present invention  
29 describes a means wherein part of the information constituting digital information (eg offensive parts) is deleted  
30 with the non-deleted portion distributed on optical means (eg CD, DVD). This means, for example, that ISP's  
31 and/or Users may cache a significant part of the information on cheap media and only download part of the  
32 information to complete the picture. Said downloaded information is preferably protected by encryption. As this  
33 preferably requires a secure processing means to decrypt, better controls may be placed on undesirable use of  
34 materials than is presently the case.

### 35 36 **4. Voice Transfer Data Reduction Means.**

37 The invention also seeks to describe a means to reduce the amount of digital information required to transfer  
38 telephone conversations, for example via the Internet.

39  
40 **4a) Voice Recognition Means.** The known art describes methods of compressing the digital data generated when  
41 a voice (and/or any other sound) is digitised. The present invention seeks to reduce digital data by means of a  
42 voice dictionary lookup means. In a simple embodiment the known art of voice recognition software may be used

1 to convert a conversation into textual information. This information may then be transferred to one at least other  
2 parties and reconverted to sound.

3  
4 A more sophisticated solution relies on the fact that for a particular speaker, their conversation is basically a  
5 limited number of phonemes that may have a variable pitch and amplitude. The spacing between phonemes may  
6 be variable. A variable amount of a conversation usually consists of pauses. The invention seeks to describe a  
7 means wherein a phoneme dictionary is created for an individual. The complex waveforms representing each  
8 phoneme are preferably digitised and each provided with a unique ID. One phoneme may be allocated for silence.  
9 One byte may encode ID's for all phonemes for a particular speaker. When the speaker has a conversation with at  
10 least one other party, said other party preferably has local access to said phoneme dictionary. This may have been  
11 previously transferred prior to making connection and/or prior to and/or during a particular telephone call. A  
12 similar process is preferably applied to other participants in the conversation.

13  
14 The preferred embodiment of the invention digitises a speaker's voice and seeks to break the digital stream into  
15 recognisable phonemes (phoneme\_basic). It then seeks to get a best fit by adjusting the amplitude and/or length  
16 of the phoneme and/or spacing between phonemes and/or any other means to get a best fit. As a non-limiting  
17 example, one byte may represent all phonemes for a user (including a code to indicate silence and one to indicate  
18 no fit possible (secure processing means below)). One second of digitised speech may require 8k bytes to  
19 represent in uncompressed form. Said one second may be represented by only 20 phonemes (for example). For  
20 each phoneme another byte may represent amplitude (phoneme\_amplitude). Each phoneme may require another  
21 byte to describe the length of the phoneme (phoneme\_length). Another byte may be used to indicate the time  
22 between phonemes (phonem\_spacing). This equates to approximately 80 byte to represent a digital signal  
23 normally requiring 8000 bytes. A preferably high speed processing means preferably tries combinations of  
24 phonem\_basic, and/or phoneme\_amplitude and/or phonem\_length and/or phoneme\_spacing to get a best fit with  
25 the actual digitised sound. For those parts that are unable to achieve a satisfactory match the actual digitised  
26 sound may be substituted. The invention also allows that phonemes may be further subdivided with different  
27 attributes coupled to part at least of said subdivided. The invention allows for the use of digital signal processing,  
28 in particular Fast Fourier Transformations in the analysis of voice signals. Although phonemes are used in this  
29 example, any means of partitioning the analogue and/or digital version of voice is allowed for.

30  
31 The simplest way of creating a user phoneme library is to create a series of sentences that cover all phonemes,  
32 preferably allowing some repetition and variation in use. These are digitised to create the basic user phoneme  
33 library.

34  
35 The receiving means uses this information to reconstruct the voice. The invention further allows that the means  
36 that uses voice recognition to create text may be combined in part at least with said phoneme compression means.

37  
38 The invention further allows that the preceding means may be open to abuse (eg. synthesising voice patterns).  
39 The invention allows for any means that secures telephone conversations that in part at least use digital means  
40 and in particular the means of the present invention. By applying the secure processing means described in the  
41 documents incorporated by reference, a secure voice system may apply. For example, the voice is processed as  
42 described above. The resultant digital information is encrypted by a secure processing means coupled to an

1 electronic appliance (eg telephone, UCDPS) local to one at least participants in a telephone call. Said secure  
2 processing means is preferably controlled by a particular user. A service provider receives the information,  
3 verifies its origin, decodes, and re-encrypts for transfer to one at least other parties to the conversation. Said re-  
4 encrypts is preferably specifically targeted to another secure processing device, preferably unique to said  
5 caller(s). The call can be thus verified as to origin and protected against eavesdropping. Furthermore, as the call is  
6 likely to be one of thousands transiting said service provider, it is difficult for third parties to determine that two  
7 at least parties have even communicated.

#### 9 Preferred Embodiment of the Invention.

11 The preferred embodiment of the invention is now described with reference to the drawings. The detailed  
12 structures already described in the preceding description of the invention may not repeated, in part at least, in the  
13 description of the preferred embodiment. Those experienced in the art will know how to adapt the means of the  
14 invention to the embodiment now described. The present embodiment should be read in conjunction with the art  
15 incorporated by reference.

17 **Figure 1** shows a general overview of a non-limiting example of how the invention may be applied in a  
18 simplistic embodiment. Those experienced in the art will be able to adapt it to more complex arrangements.

20 An Internet (and/or any other file) usually has to be created. For example developer 1 may be the originator of a  
21 file FL1. Said developer may just have updated the file from version 2 (FL1.v2) to version 3 (FL1.v3). Said  
22 developer may have used a library means, for example 6. This may include as non-limiting examples a text  
23 dictionary means 2 compatible with the text compression means of the invention, AIX image library 3 (that may  
24 include an optical library 3a and/or a writeable library 3b, eg on hard disk), a RIX image library 4, standard GIF  
25 and JPG images 5, the user GUID 7 and user RIX 8. The developer may create a web page for example using  
26 suitable software eg Frontpage. This may reference images stored in one at least image cache means (eg. the  
27 image libraries shown in 6.

29 The developer 1 will usually need to transfer the created file FL1.v3 to a server means (eg web host site 31). It is  
30 preferable that the developer only needs upload the new FL1.v3 to the server 31.

- 31 • Server 31 (and/or coupled means) are preferably responsible for generating the various partial file update  
32 means described for the present invention. For example a complete file FL1.v3c for non-compliant nodes  
33 and compliant nodes that do not have cached older versions of the file, a file FL1.v3 to indicate to remote  
34 nodes indicating to said server that they have FL1.v3 that they have a copy of the current version (refer to  
35 description), a file FL1.v2/3 to update remote nodes with version 2 to version 3, and a file FL1.v1/3 to  
36 update remote nodes with version 1 to version 3. The server means 31 is preferably responsible for adding  
37 the text compression means to files and/or parts of files.
- 38 • Alternatively the developer may create the various files required by the invention and upload them to said  
39 server 31. This may require an update means 15 to create the different files.

40 If the server 31 is non-compliant with the invention it is likely to require more storage means  
41 to keep web pages that are compliant with the invention than web pages that are non-

1 compliant (eg it needs to store a complete file for non-compliant remote nodes 40 and the  
2 various update files to meet various update requests.

3 If the server is compliant, the file storage per web site is preferably reduced (preferably  
4 significantly) and bandwidth requirements of files significantly reduced. For example,  
5 compliant nodes may store FL1.v3c in compressed form eg. using the text compression means  
6 of the invention together with update parameters for older versions of the file (eg pointers to  
7 the blocks of information that are useful in the new version). This is preferably less than the  
8 storage requirements of the same file using the known art. The various files/partial files may  
9 then be generated dynamically as required. This may be done by file processor 33.

10 • The preferred method is for the developer to upload FL1.v3 and let the server means 31 manage the partial  
11 file means and text compression means of the present invention. However, to reduce bandwidth in uploading  
12 files to servers (eg. using File Transfer Protocol) it is preferable that the developer 1 uses the means of the  
13 invention (in part at least) and becomes the server and the server becomes the receiving remote node. For  
14 example it is preferable that developer 1 maintains a copy of the last version of files uploaded to server 31.  
15 Developer may then use the partial file means of the invention and/or the text compression means and/or any  
16 other means to update the server means 31 by partial file transfer and/or compressed information.

17  
18 • The developer 1 may also need to upload image information to server 31. In the case of images 25 that are  
19 known to be available at the server (eg RIX images local to said server 31) and/or at other user accessible  
20 locations (eg. AIX image servers), the developer 1 preferably does not need to waste bandwidth by  
21 uploading these images. Images 26 that are not known to be located at one at least user accessible means are  
22 preferably uploaded to server 31. Here they preferably may be re-categorised to AIX and/or RIX images.  
23 When developing complex images (as previously described) it is preferable that a means (eg update means  
24 15) tracks simple images within said complex images, and maintains a record that can be used (preferably  
25 automatically) to upload those images that fit the description of images 26.

26  
27 Object 30 in the drawing represents the complex data pathways and intermediate nodes of the Internet.  
28

29 Webhost 31 preferably has access to its own libraries 6a. It preferably includes a means 32 to determine if a  
30 requesting node is compliant with the invention (eg. compliant ISP 50) or non-compliant (eg NC Node 50). Said  
31 means to determine have been described in detail earlier in this specification. In the case of non-compliant node  
32 40 requesting the latest version of file FL1.v3C, said server 31 preferably delivers FL1.v3c in a format consistent  
33 with the known art. In the case of non-compliant node 61 coupled to said server 31 via compliant ISP C-ISP 50,  
34 said ISP 50 may take advantage of the invention to potentially reduce the amount of data transferred when  
35 retrieving File FL1.v3. Whether or not said ISP 50 has local access to a cached version of the file FL1, it may  
36 save bandwidth by retrieving part at least of the file compressed using the text compression means of the  
37 invention. Note: the invention allows for the use of any data reduction/compression means described in this  
38 specification with any known art compression means. Further bandwidth may be saved if said ISP has local  
39 access to a cached version of the file (preferably any version). If ISP 50 already has access to a cached version of  
40 version 3, then it preferably only checks the server to validate that version 3 is indeed the current version of the  
41 file. If it has access to older versions of the file, it preferably uses the most recent version and requests the  
42 appropriate update file (eg FL1.v2/3 16b if it has local access to FL1 version 2). As said ISP 50 may have coupled

1 nodes that may have various versions of file FL1, it is preferably that it caches update means for these files.  
2 These may be effectively stored using similar means used by said server 31 to keep files compact (eg. only store  
3 sufficient information to dynamically create files and/or partial files as required). Non-compliant node NC Node  
4 61 would usually be sent the file using known means. The ISP is thus able to conserve bandwidth (and preferably  
5 cost of data) and retrieve files faster. The non-compliant node 61 is restricted to old means, however, as these  
6 links are usually untimed local calls, the main downside is slower transfers from ISP to user (and/or the reverse).  
7 In the case of compliant node 70 coupled to said compliant ISP 50, part at least of the means of the invention may  
8 be used to reduce bandwidth requirements between node 70 and ISP 50. If the ISP does not have access to a  
9 version of FL1 and node 70 does, eg FL1.v2 71 (or if ISP 50 has an older version of file FL1 than node 70), ISP  
10 50 may still retrieve FL1.v2/3 at pass it straight to node 70. Node 70 preferably reconstructs version 3 of file FL1,  
11 using, in part at least, the means of the invention. The invention further allows that ISP and or coupled nodes  
12 and/or other local means may retrieve files (current and/or otherwise) from each other. For example version 2 of  
13 file FL1 may be resident in ISP cache 53 and/or compliant node cache 54 and/or non-compliant node cache 55. It  
14 preferably be retrieved from one at least of these locations. For complaint nodes, the means of the invention may  
15 be applied to facilitate this transfer. The use of secure means may be used to ensure user files are not tampered  
16 with (eg attempts by assholes to deliberately corrupt files). ISP 50 may also have an outdated version of a file in  
17 its cache. For example, suppose node 70 presently has version 2 of file FL1 and ISP 50 has version one. The  
18 fastest way of updating node 70 may be by downloading file FL1.v2/3 from the server 31, however, this may not  
19 provide sufficient information for ISP 50 to update version 1 to version 3. One alternative is for ISP 50 to retrieve  
20 the updated file from node 70. This is usually a fairly cheap option, however, it may tie up node 70. Should node  
21 70 have a cached version of version 1, it may create a partial file update means to update ISP version 1 to version  
22 3. An alternative is to send a message to server 31 requesting an update means that enables ISP to update version  
23 1 to version 2, enabling it to use the already cached FL1.v2/3 to further update this to version 3. For example  
24 version 3 may be a text file abcdefgh, version 2 may be bbbdefgh and version 1 bbbbefgh. ISP 31 preferably has  
25 (and/or can generate) the full text of version 3. FL1.v2.3 may instruct the retention of defgh in the construction of  
26 version 3 and send the string abc to replace bbb. The server usually has no requirement to store the obsolete string  
27 bbb of version 2. FL1.v1/3 may instruct the retention of efgh and send the string abcd to replace bbbb. The  
28 obsolete string bbbb is usually discarded (and for version 1, the initial sequence bbb may have been discarded  
29 when version 2 was uploaded). However, server 31 may instruct ISP 50 that sequence efgh is to be retained, that  
30 it requires a d before said sequence to update to version 2. such that ISP 50 may use the FL1.v2/3 to further  
31 update the file. As node 70 preferably also has version two cached temporarily at least, server 31 may generate a  
32 placement command that can be used to instruct node 70 to send the actual characters required to convert ISP  
33 version one to version 2. Those experienced in the art will be able to design plural combinations. It is preferable  
34 that said server 31 also includes a means to determine the most efficient options for these updating means. Similar  
35 processes may be applied to local nodes sharing ISP 50 (for example) and/or any other nodes.

36  
37 Figure 1 also depicts a non-compliant ISP 80 that may be coupled to non-compliant node 90 and compliant node  
38 99. Non-compliant node 90 preferably functions normally as per the known art. Compliant node 99 preferably  
39 continues to have access to the features of the invention, however, it may miss out on some of the caching  
40 enhancements that may be provided by coupling to a compliant ISP. Non-compliant ISP 80 may get some  
41 reduction in data transfers because of the usually reduced demands of the compliant nodes. However, the ISP  
42 cache in particular may become inefficient as it caches multiple versions of the same file and where a cached

1 version of F11.v3c may have met the requirements of Node 80 and 90 with the known art, said ISP 80  
2 duplication, in part at least, may consume more bandwidth.

3  
4 Figure 1 further depicts non-limiting examples of means that may be coupled to a compliant node. The preferred  
5 method couples an electronic appliance (eg UCDPS 105) to the Internet is via modem 101. This is preferably by  
6 an Internet (and/or any other function) Processing Engine 100. Said engine 100 may be a functional block  
7 running under the operating means of said electronic appliance, in part at least. It may run transparently to said  
8 operating means and use the processing means of said appliance, in part at least. The preferred embodiment is to  
9 construct said engine 100 as a discrete processing means. It preferably emulates the functions of an Internet  
10 Interface such that means on the electronic appliance 105 side may not know if the system is online and/or  
11 offline. It is preferably that all Internet caching is controlled by said engine means 100. For example, by  
12 instructing the browser to have a zero byte (or minimal) cache, it will usually attempt to access to e Internet for  
13 most page and/or image accesses. Said Internet access may be simulated by engine means 100 that delivers  
14 information to browser 106 from local caches (not shown) and/or libraries 6d as non-limiting examples. This is  
15 preferably at high speed. Said engine 100 preferable includes and/or is coupled to secure processes, in particular  
16 those described in the documents incorporated by reference. Said engine preferably intercepts incoming files  
17 prior to being passed to (and/or originating from) the browser and/or any other means coupled to said electronic  
18 appliance 105. These are preferably analysed and if compliant with means of the invention, directed to one at  
19 least relevant means. For example, the files may require the file building means 115, the image building means  
20 116, text compression/expansion means (not shown). Said engine 100 may also be coupled to a phoneme  
21 processing means 120 that preferably includes a microphone 121 and speaker 122. The invention allows that the  
22 browser may be part of said engine means 100 rather than and/or in conjunction with the processing means of  
23 said appliance 105. Information processed by said engine 100 may be transferred to said browser 106 in a means  
24 compatible with the known art for subsequent display via the system graphics means 107. The invention allows  
25 that engine 100 (and/or any one at least coupled means) may inject display information directly into said system  
26 graphics means 107. The preferred means provide a separate graphics buffer 108 that, in part at least, is under the  
27 control of engine 100. The outputs of 107 and 108 are preferably mixed for output to monitor means 110. This is  
28 described in detail in the specifications incorporated by reference.

29  
30 Reference to figure 2 may assist the understanding of the next part of the specification. The structures of the  
31 partial file building means and image reduction means have been detailed in the description preceding the  
32 preferred embodiment. Figure 2 describes the preferred embodiment for dictionary text compression means. The  
33 text compression means is preferably used in conjunction with the partial file means.

34  
35 When a file is constructed to update an older version of a file it usually includes data (eg text string) to update an  
36 older version of a file. When there is no cached older version, said text string may be the entire file. Object 150 is  
37 a non-limiting example of a file suitable for use with the FBP means of the invention. The commands 151 direct  
38 placement of text and 152 is the update text string. One aim of the invention is to compress the text strings in  
39 files. One non-limiting means is depicted in object 155 that represents the means of 150 with the addition of text  
40 dictionary compression means. An on/off flag 156 may be used to indicate that this structure uses the text  
41 compression means of the invention. It may be a single bit (eg. 0= no text compression, 1= text compression).  
42 The dictionary means used 157 is preferably used to indicate the dictionary used to compress the information and

usually need to reverse the process. The invention allows for the use of multiple dictionaries. A map means 158 is preferably provided to identify sequences of compressed and plain text. For example, a bit-map may represent the sequence, wherein 0 represents words not in the dictionary and a 1 a word in the dictionary. With reference to figure 2, sax and fcd may not be in said dictionary, therefore the sequence 011110 maps the placement of words (and/or phrases and/or any object arrangement). A dictionary lookup means 159 preferably replaces words (and/or any other sequence) with a reference to said word/sequence in said dictionary. The residual text 160 that is not coded (in this pass at least) may be left as a text string. A means is preferably included to delineate words/sequences. The reversal of this process to regenerate the original information should be obvious to those experienced in the art.

#### **Intrachip and Interchip signal propagation using optical means.**

The means of the invention may require an increase usage of data processing as compared with known means however, this increased processing time is preferably more than offset by the reduction in bandwidth required for transfer of information over network means. The preferred embodiment allows for the use of distributed processing (preferably using many low-cost CPU's). This may require a large degree of interconnectivity. Said interconnectivity may include the integration of multiple processors into a single IC and the connections between IC's and modules. One means to improve said interconnectivity is by optical means, in particular those disclosed herewith. It will be appreciated that said optical means may have application in areas other than the present invention.

The present art of semiconductor design is such that the propagation of electrical signal within an integrated circuit may cause greater delays than the switching of electronic devices (eg. logic gates) within said IC.

One problem within modern IC's is ensuring that one at least clocks within an IC, clocks, as far as practical, at the same time throughout the chip. The variability in the length that the clock must propagate from its origin to one or multiple targets and the capacitive delays involved in charging/discharging the conductive pathways may make accurate prediction of clock nets difficult to estimate and/or compensate for. This problem is likely to exacerbate with increasing miniaturisation of devices.

Said optical means may allow for a means of converting, in part at least, one or multiple electrically generated clock signals (that may originate within and/or external to an IC) into one or multiple electromagnetic frequencies (with the preferred bandwidth across the optical and/or infrared spectrum) for transmission to one at least optical receiver means (that may be within and/or without the IC) that, in part at least convert the received optical signal(s) into electrical signals suitable for clocking (directly and/or indirectly) semiconductor devices (within and/or external to the IC). The path may be direct (eg electrical to optical to electrical), and/or indirect (eg electrical to optical, to optical, to electrical, to optical, to electrical). The invention also allows that any one at least clocks may be created external to an IC and enter in optical form and/or that any optical clock created within the IC (and/or passing through the IC, using any means, that may include directly and/or indirectly clocking devices within said IC) may exit said IC in optical form, and/or any optical clocks created within said IC may exit said IC in optical form.

The term optical signal in this specification may refer to any one or multiple electromagnetic frequencies.



Optical propagation of clocks may have advantages, non-limiting examples may include:

- i) the propagation of optical signals is constant and not affected by capacitive delays,
- ii) the propagation delay is a simple calculation given the physical location of the transmitting source(s) and one or multiple receiving sources.
- iii) minimise high frequency noise along conductors.
- iv) the system may be readily adapted from the known art for high speed transmission of fibreoptic signals, to permit clock speeds of multiple gigahertz that for practical purposes are synchronous to multiple targets.
- v) the ability to get the clock to parts of the chip that may be heavily congested by wiring.

Reference to figure three shows one arrangement of the invention. The normal base of the IC with pins attached is represented by 201, with one or multiple IC substrates 202 attached. One or multiple optical clocks are represented by 203 (this may use any means for converting an electrically generated (direct and/or indirect) clock signal into an optical signal. One or multiple optical receivers 204 are attached (directly and/or indirectly) to the substrate 202. Said optical receivers 204 may use any known means for receiving an optical signal(s) and converting (in part at least) it to an electrical signal(s).

The invention allows for any means of generating:

- multiple optical sources 204 for any particular clock signal (for example and non-limiting, optical clock sources representing the same clock may be distributed throughout the chip),
- multiple different clock signals (for example and non-limiting, multiple clock lines each activating one or multiple optical transmitters)

The invention allows for any means of propagating the optical signal from transmitter(s) to receiver(s). The preferred method of propagation is to create an optically conducting space 207 between the chip substrate and the cover of the chip 205 by leaving an open space inside the IC package. Said space may be replaced in part at least by any optically conducting medium.

The invention allows for any means of improving the propagation of the optical signal from source to destination. This may include (as non-limiting examples):

- lining the interior of the cover (and/or any other part of the package and/or contents) with a suitably reflective material 206;
- optical conducting pathways between source 204 and destination 203, non-limiting examples that may include
  - one at least optical conducting channels via any material filling part at least of said space 207;
  - one at least optical conducting channels (that may be optical conducting material and/or one at least holes) within one at least chip substrates;
  - one at least optical conducting channels (that may be optical conducting material and/or one at least holes) within the base 201 and/or cover 205 and/or any other part of the IC.

1  
2 The invention allows for any number of optical clock sources. These may be multiple versions of the same clock  
3 and/or multiple different clocks.  
4

5 The invention allows for any means of preventing any particular clock triggering non-targeted receivers, that may  
6 include the following non-limiting examples:

- 7 • a) one means is to use physical barriers to optical transmissions (a non-limiting example  
8 may include suitably moulded extensions of the material used to form the IC package.

9 reference to figure 4 shows a simple arrangement with two different clock sources  
10 203a and 203b arranged on substrate 202. The physical partition 210 constrains the  
11 optical signal from 203a to the receivers identified as 204a. Partition 210 constrains  
12 the optical signals from transmitter 203b to the receivers identified as 204b. The  
13 invention allows for any number of receivers and transmitters in any combination  
14 and any number of partitions.  
15

- 16 • b) generation of a different optical frequency for two or more optical transmitting sources  
17 and customise two or more receivers such that they only respond to optical frequencies  
18 emitted by particular optical transmitters.

- 19 • this may be better understood by reference to figure 5 that shows three optical  
20 transmitters, each of a different frequency and attached to substrate 202. Said  
21 transmitters are identified as 203a, 203b, 203c. Optical receiver 204a responds  
22 to the frequency from source 203a, receiver 204b responds to source 203b,  
23 receiver 203c responds to source 203c and receiver 204d responds to sources  
24 203a and 203b.  
25

- 26 • c) one or multiple optical receivers may be inactivated, by any means including electrical  
27 and/or optical signals, such that it is not responsive to one or multiple optical sources for  
28 any period and/or combination of periods of time.  
29

30 The invention allows for any means of converting, in part at least, one or multiple electrically generated signals  
31 into one or multiple electromagnetic frequencies (with the preferred bandwidth across the optical and infrared  
32 spectrum). Non-limiting examples of said signals (that may originate within and/or external to an integrated  
33 circuit) may include data and/or address and/or control and/or any other signals. Said electrically generated  
34 signals may be transmitted to one or multiple optical receivers (usually within the IC). Said receivers preferably  
35 include and/or are coupled to a means to, in part at least, convert the received optical signal(s) into electrical  
36 signals suitable for driving (directly and/or indirectly) semiconductor devices within and/or external to the  
37 integrated circuit. Said one or multiple electrically generated signals may be collectively referenced as non-clock  
38 signals in this specification.  
39

40 Any one or multiple non-clocks may be created external to the integrated circuit and enter, in part at least, in  
41 optical form. Said non-clocks may interact in any way using any means with any optical clocks and/or non-clocks  
42 created within the IC. Said non-clocks may exit the integrated circuit in optical form.

Any means described for optical clocks may be applied to any combination of non-clock signals. Any combination of optical clocks and optical non-clocks may be active within an IC (concurrently and/or otherwise).

Any one or multiple optical transmitters may be associated (preferably integrally) with one at least optical receivers,

and/or

any one or multiple receivers may be associated (preferably integrally) with one or multiple optical transmitters, providing for the bidirectional transfer of information.

Transmitters and/or receivers in the preceding arrangements may have any of the means described for transmitters and/or receivers in any other arrangement.

Receivers and transmitters do not need to be coupled for the bi-directional transfer of information.

Physical limitations and/or frequency limitations and/or any other reason may limit the number of different optical sources and/or receivers that may be included within an integrated circuit. The invention allows for any means that takes one or multiple electrical inputs (and/or optical inputs) and multiplexes them into one at least optical transmitters. The invention allows for any means that takes the electrical (and/or optical) signals produced by one at least optical receivers and demultiplex the recovered signals into multiple outputs. These multiplexing and demultiplexing means may be used for any application, and may have particular application in distributing plural address and/or data signals through part at least of one at least IC (and/or between IC's). Said address and/or data signals are preferably converted, in part at least, to a serial stream of optical pulses and preferably reconverted, in part at least, to parallel electrical signals after optical reception. One non-limiting advantage of this mux/demux means may be to reduce the complexity of signal routing within an IC and/or the improved utilisation of silicon (and/or any other substrate).

The serialising of parallel information and the reverse process at its target (and/or any other location) may be facilitated by the means that may switch optical signals faster than electrical signals. This increased speed may depend on the use of different semiconductor material for high speed (eg. GaAs). Any means to mix substrates (eg GaAs, silicon) is allowed for, non limiting examples of which may include:

- integration of multiple processes onto one wafer,
- the attachment (eg. bonding wires) of one or multiple discrete substrates (that may be of different types) onto one at least substrate means (eg. silicon, glass, plastic base).

Reference to figure 6 may help clarify the preceding means. Electrically generated data D0-D7 is clocked from a parallel to serial converter by high speed clock CLK1. The outputs of 211 are converted to optical signals by 203a and 203b, and reconverted to electrical signals by receivers 204a and 204b. The received data is clocked into a serial parallel converter by CLK 201 that is transmitted by 203c and received by 204c. CLK 2 is the usual system data clock and is transferred by optical transmitter 203d and received by 204d, from which it clocks the data into the target device (eg. a register and or memory location) 213. In this example each transmitter is a unique frequency and each receiver is responsive to a particular frequency. It will be appreciated by those experienced in the art that any number of signals may be arranged in many ways, in many combinations, to effect a similar outcome. Additionally, part or all of the means may be mirrored at either end to provide for the

1 bidirectional transfer of information. While only one source and destination are shown, there may be any number  
2 of either. Any links that are optical may be replaced in part at least electrical, and any electrical links may be  
3 replaced in part or whole by optical links.

4  
5 A particular application of the invention is described with reference to Figure 7. In this case the substrate 202 is  
6 shown with three discrete logic blocks (there may be any number of any type), that in this example are a central  
7 processing core 220 (there may be any number), and two SRAM blocks 221 and 222 (there may be any number).  
8 The only connections in common are ground 226 and power 225. By converting part or all of the data (and/or  
9 address bus) to serial optical signals in 203a,203b,203c and 203d of CPU logic 220, and equivalent serial  
10 receivers 204a,204b,204c and 204d in SRAMs 221 and 222, together with control lines (eg. r/w and select)  
11 203e/204e for SRAM 221, and 203f/204f for SRAM 222, discrete logic blocks can be interconnected in part or  
12 whole (with the exclusion of power rails) by optical means. Such an arrangement as shown in Figure 7 would  
13 usually have bidirectional optical facilities for data paths. For clarity these are not shown. Any part or all of the  
14 optical links shown (and/or any others) may be replaced by electrical connections.

15  
16 The invention allows for any means that may reduce part or all of the data and/or address bus and/or control  
17 conducting lines (including clocks) linking one or multiple processing means and/or one or multiple memory  
18 storage means and/or one or multiple other partitionable logic means, by replacing part or all of said conducting  
19 lines by optical connections, using part or all of the means described in this application. Said optical connections  
20 may be one for one, and/or any multiplexed arrangement.

21  
22  
23 Figure 7 shows multiple logic blocks integrated onto the same substrate. An important facility provided by the  
24 invention is a means to allow various logic blocks (in part or whole, in any combination) to be manufactured on  
25 separate substrates and bonded (or attached using any means) into the chip package and linked with a minimum  
26 of wired (or any other electrical) connections. Said bonded may be onto the chip package itself, and/or onto part  
27 of one or multiple other chips within the IC package. This method permits multiple chips that may use different  
28 processes in their manufacture, to be readily linked with high-speed optical connections, in part at least. Figure 8  
29 shows the internal surface of the base of the chip with a ground rail 226 and power rail 225. Three distinct IC's  
30 CPU 220, SRAM 221 and SRAM 222 are attached to the power rails (225,226). All other inter-chip connections  
31 are preferably optical. In most practical applications, part or all of one or more of 220,221,222 would have  
32 connections (that may be optical and/or electrical) outside the chip package. While not shown in the drawings,  
33 part of 220 and/or 221 and/or 222 may be bonded onto part or all of 220 and/or 221 and/or 222. Any optical links  
34 may be replaced in part or whole with electrical connections, with the reverse also applying (where applicable).  
35 The invention allows that any method may be used to deliver power to the various discrete chips within the IC  
36 package. A special implementation of the invention is described with reference to Figure 9. One or multiple  
37 chips 202 arranged using any means, including those described with reference to Figure 7 and 8, are attached to  
38 the base (internally) of the chip package. One or multiple chips 230, arranged using any means, including those  
39 described with reference to Figures 7 and 8, is bonded to the internal surface of the top of the chip 205. Power  
40 rails need to be attached to 202 and 230 (these may be common and/or separate) and part or all other connections  
41 performed optically (203a, 203b, 204a, 204b). This method improves packing density for a given area, provides  
42 very short optical paths and provides multiple complex structures to be integrated within a single package and to

1 interface to one another. The invention also allows for any means that permits more than two layers of chips (in  
2 part or whole) to be arranged within the IC package; this may include, in part at least, provision of holes within  
3 intermediate chip layers, and/or receipt of signals and retransmission, and/or suitable arrangement of lenses and  
4 reflecting surfaces, and/or use of various optically conducting media (eg. fibreoptics).

5  
6  
7 The invention allows for any means of interconnecting multiple discrete chips, within a single IC package (in part  
8 at least), wherein said discrete chips are interconnected in a planar arrangement; and/or a stacked three  
9 dimensional arrangement, wherein, part or all of the interconnections between said discrete multiple chips,  
10 including part or all of the data lines and/or address lines and/or control lines and/or clock lines, is by optical  
11 linkage, using any part or all of the means described in this application, and part or all of the bonding (using any  
12 means) of said discrete chips may be to part of the chip(s) package and or part of one or multiple other discrete  
13 chips and or by any other means. Said any discrete chips may have any part of their logic areas linked intrachip  
14 by optical means, using part or all of the means described in this application. Said multiple discrete chips may  
15 provide any combination of functions, and this may include any combination of one or multiple processing means  
16 and/or one or multiple memory storage means.

17  
18  
19 The rapid rise in popularity of the Internet coupled with the fact that most households still have a single telephone  
20 service means that the line is frequently engaged to incoming calls. A non-limiting objective of the present  
21 invention seeks to provide a method and apparatus that permits attempts at incoming calls on a particular  
22 telephone line to be advised and/or connected to a user, while,  
23 said user and/or their computer remains connected on said telephone line by modem or similar, to one at least:  
24 remote processing, and/or data storage, and/or switching facility (eg. Internet Service Provider), also collectively  
25 referenced as an online facility in this document. The method takes advantage of call diversion facilities when  
26 linked to a telephone service. Said call diversion refers to any means that permits incoming calls to be redirected  
27 to one at least alternative telephone numbers while permitting outgoing calls to be made from said telephone  
28 service. The method includes any means to determine (at least part of the time) when an attempt is made to  
29 connect to said online facility and/or when said attempt is successful, wherein, the outcome of said determine,  
30 influences activation of call diversion. Said activation is preferably prior to connection to said online facility,  
31 however it may be at any other time, including by said online facility after connection is made.

32  
33 The preferred method to said determine and/or said activate is one that is transparent to the software (eg. a net  
34 browser) used to establish the connection to the online facility. This approach usually does not require  
35 modification of existing software. Said preferred method preferably includes a physical device that can intervene  
36 between information output from a computer to establish a link with said online facility and establishment of said  
37 link (eg. completion of the telephone connection). Said information to establish a link is usually that which  
38 initiates dialing pulses representing the telephone number of the target online facility. Said intervene, is  
39 preferably prior to transmission of the electrical and/or optical signal from the users location. Said physical  
40 device may be in any suitable location, including the modem, however, it is preferably located prior to the serial  
41 interface (or equivalent) connecting the computer to the modem in the case of an external modem, and prior to

1 the modem logic in the case of an internal modem. The preferred physical device is within a secure processing  
2 device as described in PCT AU/97/00010, modified to perform serial data transfer functions.

3

4 Said physical device may include any means to determine when information to be output on a telephone line is to  
5 initiate a call to said online facility and any means to activate call diversion, preferably prior to said initiates.

6 There are well known protocols for initiating modem connections with remote locations. The preferred  
7 embodiment of the invention includes a processing means that can interpret said protocols prior to output, and  
8 where prudent, add additional information to the output stream prior to outputting said protocols. Any means may  
9 be used to achieve this with the preferred method including a lookup table (preferably programmable) that  
10 includes:

11 telephone numbers of at least one online facility and information on the codes required to effect call diversion;  
12 and/or information to initiate call diversion; and/or information to verify said call diversion as effective; and/or  
13 information to terminate said call diversion; and/or information to verify termination of said call diversion.

14

15 Said processing means preferably examines information for output to the modem and detects protocols that will  
16 dial-up a telephone number. The number to be dialed is preferably extracted and compared with information in  
17 said lookup table. If there is a match (or any other method to effect a similar outcome) said processing means  
18 examines the codes necessary to effect call diversion and sends these along the telephone line. The invention also  
19 allows for any means to validate that said call diversion was effected. Said processing means would then  
20 normally output the information required to establish a telephone link with said online facility.

21

22 The invention also allows for any means to determine when a telephone connection with said online facility has  
23 terminated wherein said determine in part at least influences the termination of said call switching. The preferred  
24 method to achieve this is included within the physical device used to initiate call diversion. Said physical device  
25 preferably uses means well known to those experienced in the art to monitor the state of the modem connection  
26 with the telephone line. The preferred embodiment has said processing means extract information from said  
27 lookup table to determine the codes to send to terminate said call diversion. Said processing means preferably  
28 initiates a call to the telephone company and transmits the appropriate tone pulses to terminate said call diversion.

29

30 An alternative embodiment of the invention allows for part at least of the preceding method and/or apparatus to  
31 be implemented in a switching device that intercept part at least of the link between modem (or equivalent) and  
32 the telephone cable connecting to the telephone company network. The preferred location of said switching  
33 device is coupled to the wall socket of the telephone, although any location is allowed for. The invention allows  
34 that said switching device may be integrated in part at least with a device described in a co-pending application  
35 titled "Automatic STD and ISD Telephone Dialing Re-router". Said preferred switching device in part at least  
36 preferably includes a means to:

37 intercept signal on lines carrying dialing information and modify said information (eg. by the addition of extra  
38 digits and/or deletion of part of the number);

39 and/or

40 delay transmission of said dialing information, until other information has been sent, (eg. tones to connect to a  
41 telephone company and additional tones to activate call diversion);

42 and/or

1    verify activation of said call diversion;  
2    detect termination of calls to an online facility;  
3    and/or  
4    disable call diversion;  
5    and/or  
6    verify disablement of said call diversion.

7

8    Said switching device is preferably programmable, with the preferred means to send a normally unused  
9    telephone number to said switching device to activate programming.

10

11    The invention also allows that those experienced in the art should be able to implement part at least of the method  
12    of the invention in software. The invention allows for any means that in part at least implements the method  
13    and/or apparatus of the invention in software routines executing under one at least system microprocessors within  
14    a User Controlled Data Processing System. In particular this applies to Net Browsers and/or the software used to  
15    establish a connection with an online facility.

16

17    The method and apparatus described thus far provide an effective and transparent method of redirecting incoming  
18    calls to an online connection to another source and of removing said redirection when required.

19

20    A method and apparatus is now described to make use of said call diversion to establish contact between one at  
21    least callers to a user while their telephone line is engaged during connection to an online facility.

22

23    Any means is allowed that permits a caller who has been redirected to make direct and/or indirect contact with  
24    said user (and/or any other party at the location of the user's telephone), preferably without disrupting the user's  
25    connection with the online facility.

26

27    The preferred means of implementing contact between caller and user is to redirect the users calls to one at least  
28    telephone numbers coupled to said online facility. The invention allows for any means that:  
29    permits said caller to leave a written and/or verbal message for the user, and/or the reverse;  
30    and/or  
31    that notifies the user of said written and/or verbal message, and/or the reverse.

32

33    The invention also allows for any means that enables said caller to make voice contact with said user and/or for  
34    said user to make voice contact with said caller.

35

36    The caller may be identified using any means, including in part at least, by having the online facility extract  
37    information relating to caller ID. The preferred methods to determine who the caller wishes to contact and/or any  
38    additional information (that may include part at least of that included within caller ID information) may include  
39    providing the online facility a voice facility to:  
40    advise the caller of various options and/or any other information;  
41    and/or  
42    request and/or receive any information.

1 Said voice facility may be human and/or electronic. These methods are known to those experienced in the art.  
2 The caller is preferably asked to provide information using the keypad of their telephone, particularly when using  
3 electronic means. The invention also allows that the caller's voice may be digitised, in part at least. This may  
4 include processing by voice recognition means.

5

6 The invention allows that any information, including that about the caller and/or supplied by the caller may be  
7 sent to the user. This may include the callers telephone number, and/or name, and/or message. The invention  
8 allows for any means of providing the user with said information. Said means of providing may include the  
9 transfer of text and/or any other visual information. It may also include the transfer of digitised sound  
10 information. The invention allows that said information may be transferred to the user in realtime and/or delayed.

11

12 One embodiment of the invention allows for the online facility to establish an online voice chat-channel (using  
13 methods known to those experienced in the art) preferably using:

14 the callers telephone as the microphone and/ or speaker with the online facility providing the actual net access;

15 and

16 any means at the user end, preferably the microphone and speaker system coupled to their User Controlled Data  
17 Processing System.

18 The net access provided by the online service may in part at least simulate net operations.

19 A similar method may be used that bypasses the need for an internet voice channel, by sending digitised  
20 information to and/or from user/ online facility.

21

22 The invention allows for any means to advise the user that there is a message and/or caller pending. One means  
23 is to send the user Email. However, this may not gain their immediate attention. A preferred embodiment actually  
24 intercepts the next web page access and includes a message within its text. This does not usually require any  
25 special software at the users end. Another preferred embodiment sends the user a message using any of the  
26 known means of transmitting warnings or similar to a user.

27

28 Yet another preferred embodiment and one that makes the process transparent to software executing under the  
29 normal computer operating system, includes: a method for extracting information from incoming information  
30 and/or adding information to outgoing information to meet the visual and/or voice communications between  
31 caller and user via said online facility, with the addition of transparent voice and/or image generation at the user  
32 end further enhancing this process. This method may be implemented using any means, including an extension  
33 of the method used to intercept dialing information. The inclusion of video and sound generating capability  
34 within the physical device used to intercept dialing meets these requirements.

35

36 System for Intelligent Remote Control Device.

37 The use of remote control devices to control television, video players and any other type of audio/visual display  
38 devices has proven convenient for consumers. The present invention describes a method and apparatus to  
39 broaden the facilities that remote control and functionally similar devices can provide.

40



1 The invention describes a preferred means, however, it also allows for any other means, that connected directly  
2 (including integrally) and/or indirectly, in part at least, to a Defined Control Device (also referred to as a DRC),  
3 Devices.

4  
5 A Defined Control Device is any control means (in part at least) that is:  
6 connected remotely by any means, including an infrared and/or optical and/or ultrasound and/or radio frequency  
7 and/or electrically conducting cable and/or optically conducting cable, to the device(s) it is controlling.  
8 and/or  
9 connected directly (including integrally) and/or indirectly by any means to the device(s) it is controlling,  
10 that controls, in part at least, one or multiple Controlled Devices, wherein said Controlled Devices may include

11  
12 i) any device (also referred to as a Visual Information Display or VID in this application) that, in part at least,  
13 displays visual information (including information on a CRT and/or liquid crystal display and/or plasma display),  
14 wherein part at least of said visual information displayed is transmitted directly and/or indirectly from any one or  
15 multiple remote location (eg. a television station), using any one or multiple means including, but not limited to,  
16 information broadcast using the radio frequency spectrum, and/or infrared, and/or optical, and/or cabling using  
17 electrical conductors, and/or optical fibre;

18 and/or  
19 ii) any device (also referred to as Video Playback Devices or VPD in this application) that in part at least  
20 intercepts (directly and/or indirectly) using any means, said visual information, between the time said visual  
21 information is transmitted and the time that it is displayed, including video tape recorders and/or players, and/or  
22 optical disk recorders and/or players, and or any data processing device used to record and/or play in part at least  
23 video information (including video information that may be processed in part or whole in any way prior to  
24 display), wherein said intercept may be any functionally non-delayed intercept (eg. the use of a video recorder to  
25 immediately reroute incoming visual information to the VID), and/or any delayed rerouting of information (eg.  
26 the recording of the transmitted visual information for delayed and or repetitive playback);

27 and/or  
28 iii) any device (also referred to as an Audio Generating Device or AGD in this application) that, in part at least,  
29 electronically generates any sound (including music and vocals), and said AGD includes television and radio  
30 receivers, wherein part at least of the audio information used to generate said sound is transmitted directly and/or  
31 indirectly from any one or multiple remote location (eg. a television and/or radio station) using any one or  
32 multiple means, including but not limited to information broadcast using the radio frequency spectrum and/or  
33 infrared and/or optical, and/or cabling using electrical conductors and/or optical fibre;

34 and/or  
35 iv) any device (also referred to as an Audio Playback Device or APD in this application) that in part at least  
36 intercepts (directly and/or indirectly), using any means, said audio information between the time said audio  
37 information is transmitted and the time it is displayed, including audio and/or video tape recorders and/or players,  
38 and/or optical disk recorders and/or players, and or any data processing device used to record and/or play in part  
39 at least said audio information (including audio information that may be processed in part or whole in any way  
40 prior to conversion to sound), wherein said intercept may be any functionally non-delayed intercept (eg. the use  
41 of an APD to immediately reroute incoming visual information to the AGD), and/or any delayed rerouting of  
42 information (eg. the recording of the transmitted audio information for delayed and or repetitive playback); when

1 said control means can be influenced directly and/or indirectly: by the consumer and/or by any remote means,  
2 and said control means determines in part at least, directly and/or indirectly, any one or multiple of the following:  
3 a) the selection of any one at least sources of visual and/or audio information, including the selection of a  
4 particular broadcast and or cable television station (eg. channel selector), and/or broadcast and/or cable radio  
5 station (eg. tuning frequency of the receiver) of said Controlled Devices;  
6 and/or  
7 b) the selection of any alternate sources of audio and/or video information for use directly and/or indirectly by  
8 said Controlled Devices, including that, in part at least, computer generated,  
9 and/or previously recorded on tape and/or optical media and/or any other medium;  
10 and/or  
11 c) the volume of the sound (including absence of sound) generated directly and/or indirectly by said Controlled  
12 Devices;  
13 and/or  
14 d) the brightness and/or contrast of the image displayed (including no image displayed) directly and/or indirectly  
15 by said Controlled Devices;  
16 and/or  
17 e) the recording of information onto any means, including tape and/or optical media and/or computer memory  
18 storage devices by said Controlled Devices;  
19 and/or  
20 f) the playback of information recorded as described in e) and or by any other means by said Controlled Devices.

21  
22 One popular use of remote control devices is to change the channel, mute or eliminate the sound, and or blank or  
23 dim the picture when one or multiple commercials are being displayed on a television. The problem with this is  
24 that the viewer/listener usually needs to periodically reverse these processes (in part at least) to check whether or  
25 not the normal program has recommenced. A remote control device that could detect when the normal program  
26 has recommenced on at least one desired channel and/or that detects any other one or multiple events (usually  
27 predetermined by the consumer) would be expected to benefit consumers. Consumers may be able to select items  
28 of a type and/or level of importance, and/or they may wish to view commercials from particular companies  
29 and/or they may wish to view commercials with particular content and/or they may wish to view commercials  
30 rated to a predetermined level of content interest (eg. those that are entertaining).

31  
32 iv) any means of transferring information about the current time and/or date.

33  
34 One embodiment of the invention allows for any means attached directly and/or indirectly to a Defined Control  
35 Device (DCD) that may receive and/or interpret Content Information transmitted (using any means) from one or  
36 multiple Service Providers.

37  
38 As part of the Content Information may be used to bypass advertising material used to generate revenue for the  
39 Information Provider, the Service Provider is usually independent of the Information Provider, however, the  
40 invention allows that part or all of the Content Information may be provided by Information Providers.

1 The invention allows for any means that permits Service Providers to generate any type of Content Information  
2 pertaining to any one or multiple Defined Material. This may be with and/or without the permission of one or  
3 multiple Information Providers. The preferred means is to have one or multiple people (usually employees of the  
4 Service Provider) viewing and/or listening to Defined Information using any one or multiple methods available to  
5 the consumer. This process may be assisted using any means, including any type of data processing system. Said  
6 people usually classify the material into various categories that may be supplied to any data processing means  
7 (and/or any other means) for compilation (that may be combined with any other information, from any source, eg.  
8 programming information, current time) into Content Information for subsequent transmission, using any means,  
9 to one or multiple Defined Control Devices, at one or multiple consumers.

10  
11 The invention allows for any means that may include within the Content Information, a means that permits  
12 televisions (and/or any equivalent and/or any other Controlled Device) that are not equipped with the 'V-Chip' to  
13 be able to perform any equivalent function, in part at least, to televisions (and/or any equivalent and/or any other  
14 Controlled Device) that are equipped with said 'V-Chip'.

15  
16 The invention allows for any means of deriving V-Chip equivalent information for any one or multiple Defined  
17 Information, for subsequent use in directly and/or indirectly influencing, in any way, at least one DCD to cause,  
18 in part at least, one or multiple Controlled Devices to perform equivalent and/or enhanced functions as would be  
19 the case with an installed V-Chip.

20  
21 The preferred method to derive V-Chip equivalent information is any system that may electronically extract the  
22 relevant information embedded within Defined Information supplied by one or multiple Information Providers,  
23 where said embedded information is used to control (in part at least) a V-Chip when present and activated.

24  
25 The Service Provider may extract V-Chip information from Defined Information as it is being broadcast (and/or  
26 otherwise supplied), for immediate transfer as Content Information to the consumer. The preferred method  
27 supplies a V-Chip and or equivalent logic with the relevant input signals, and uses one or multiple output signals  
28 to indicate to any data processing means the type of V-Chip equivalent information that is to be included in the  
29 Content Information.

30  
31 Part or all of the V-Chip equivalent information may be obtained by preprocessing of Defined Material by the  
32 Service Provider and/or in part or whole, from any one or multiple other sources.

33  
34 The invention also allows for V-Chip equivalent information (and/or an estimate of and/or enhanced version of),  
35 in part at least, to be synthesized using any means. This is usually by one or multiple individuals viewing the  
36 information and determining those sections unsuitable for the audience that would normally be affected by the  
37 presence of a V-Chip. Said determination may be in realtime and/or processed, and may be for any reason. The  
38 usual reason is that Defined Information does not include V-Chip information and/or that the criteria used (in part  
39 at least) to originally create V-Chip information are not suitable for the intended audience.

1 V-Chip information and/or V-Chip equivalent information may be used, in part at least, to create one or multiple  
2 codes within Content Information to cause one or multiple target Defined Control Devices to direct one or  
3 multiple Controlled Devices to effect any V-Chip functional equivalent and/or enhancement.

4  
5 The invention also allows for any means at the consumer location, apart from a V-Chip within the television  
6 (and/or equivalent), that extracts V-Chip information (in part at least) from Defined Information and, in part at  
7 least, performs directly and/or indirectly, any of the functions described for DCD and/or Controlled Devices  
8 and/or Defined Information in response to V-Chip and/or V-Chip equivalent information transmitted as Content  
9 Information.

10  
11 While the V-Chip usually functions by blanking the screen (and or the sound) and/or placing snow (and/or  
12 equivalent) on screen to prevent children (and/or any other groups) viewing information deemed unsuitable by  
13 parents (and/or any other groups), the invention may redirect the consumer to any one at least alternate sources of  
14 information (eg. another channel and/or any other source of video/sound information such as video cassette,  
15 video disk, computer games, teletext,, content information.

16  
17 The invention allows for any means that may remove and/or modify (using any means) undesirable information  
18 by providing (in part at least) one or multiple alternate sources of video and/or sound. The invention allows for  
19 any means attached directly (including integral) and/or indirectly to one or multiple V-Chips that may provide  
20 any type of means to switch to an alternate video and/or sound source when said V-Chip modifies (in any way)  
21 information displayed on the associated image output devices.

22  
23 The preferred method of transmitting Content Information from a Service Provider to the Consumer is the  
24 broadcasting on any permitted radio frequency using any one or multiple transmitters, for reception by one at  
25 least radio receivers attached directly and/or indirectly, in part at least, to one or multiple Defined Control Device  
26 located with one or multiple consumers. The preferred means may use a bandwidth used to send digital  
27 information to electronic paging means and piggyback onto an existing provider of this information. The means  
28 to transmit and receive this information are known to those experienced in the art.

29  
30 The invention allows that any other radio transmission means and/or frequency spectrum may be used to  
31 broadcast Content Information.

32  
33 The invention also allows that Content Information may be supplied using any cable means (including  
34 electrically conductive and/or optically conductive), including cable TV links (and/or equivalent) and/or switched  
35 public telephone network. This may be a cable link means directly to the consumer, with any means to retrieve  
36 this information, that may include any direct and/or indirect means using the Internet;  
37 and/or the use of any cable means to deliver Content Information to any other one or multiple means for further  
38 transmission to the consumer. Said further transmission may include any cable means, that may include local  
39 cabling ( electric and/or optical) and/or any radio transmission means, and/or any infrared transmission means,  
40 and/or any optical transmission means (that may include laser), and/or any ultrasound transmission means, with  
41 said further transmission means also referenced in this application as Distributed Transmission.

42

1 The invention also allows for any non-cable means (including any method described previously for direct transfer  
2 to consumers) to transmit information to any distribution means that may further redistribute it to consumers.  
3 Said distribution means may include any means discussed for Distributed Transmission and/or any other means.  
4

5 The invention also allows that the receiving device for Content Information may be compatible with cellular  
6 phone (and/or similar) transmissions, and that this may include:  
7 one or multiple receiving means that retransmit (using any means) to consumer locations,  
8 and/or  
9 receiving means located in the consumer location, that may include means directly and/or indirectly attached to a  
10 DCD and/or any other means.  
11

12 To minimise the number of open channels used when accessing the cellular telephone network (and/or for any  
13 other reason), the invention allows for any means that may permit multiple devices to receive from the one  
14 channel (and/or the same digital address), with only one (or a limited number) of devices transmitting to the base  
15 station in a particular cellular area. This method is also referenced as Generic Reception with Controlled  
16 Transmission (or GRCT). The invention allows for the use of GRCT with any means that requires the generic  
17 broadcasting of information to multiple devices with a receiving means in one or multiple cellular areas. The  
18 preferred method of implementing GRCT is to have a known device (referenced as the Master Device) within  
19 each required cellular area. This performs the normal transmit and receive functions and is used to establish the  
20 normal parameters for information interchange. One or multiple other devices (Slave Devices) within the cellular  
21 area are programmed to the same parameters as the Master Device and follow its behaviour. Slave Devices do  
22 not usually transmit back to the base station. Because a cellular area may continually shift frequencies and  
23 because a Slave Device may be activated after a Master Device has initiated contact with a base station (and/or  
24 had contact established by receipt of a call), the invention allows for any compensating means, including  
25 regularly terminating Master Device links and re-establishing them. This method provides a very economical  
26 means of supplying multiple receiving stations with the same information (in part at least), using an  
27 established and reliable transmission means. It has particular use in the transmission of Content Information in  
28 the context of the current invention, and any other generically supplied electronic information eg. electronic  
29 newspapers, books, magazines.  
30

31 The invention allows that GRCT may be used for personal paging systems, avoiding the need to establish  
32 multiple dedicated paging transmitters. Any method is allowed for that may permit the Slave Device to become  
33 attached to a new master as it shifts from one cellular area to another.  
34

35 The Content Information is preferably transmitted in digital format using pulse code modulation, however, any  
36 other method may be used for said transmission, including any combination of means.

1  
2 Claims.  
3

4 1. A method of transferring a file means located on one at least servers, to one at least nodes remote to said  
5 server, wherein, said file is constructed in part at least, from information locally accessible to said node and  
6 from information delivered from said server.

7  
8 2. The method of claim 1, wherein said server and remote node are coupled to the Internet.

9  
10 3. The method of Claim 1, wherein said information locally accessible includes information in a previous  
11 version of said file and said information delivered includes information to update said previous version to a  
12 more recent version.

13  
14 4. A method of naming image files used on the Internet, wherein the images coupled to said files are known  
15 to be constant across a plurality of websites.

16  
17 5. The method of claim 4, wherein said plurality are common across different websites located on a  
18 plurality of geographically different webhost sites.

19  
20 6. The method of claim 4, wherein, said image naming means includes an absolute indexing means.

21  
22 7. The method of claim 4, wherein said plurality are common across different websites located at one at  
23 least webhost sites.

24  
25 8. The method of claim 4, wherein said image naming means includes a relative indexing means.

26  
27 9. A method of transferring image files from a server means to one at least remote nodes, wherein the image  
28 is constructed at said remote node in response to a series of commands.

29  
30 10. The method of claim 9, wherein said commands emulate in part at least the processes used to create the  
31 image.

32  
33 11. A method of transmitting digital telephone conversations wherein the receiving means includes a library  
34 of predetermined modules representing part at least of the sending means sound waveforms.

35  
36 12. The method of claim 12, wherein said modules include phonemes used by the sending party.

37  
38 13. A method of transferring information on the Internet, wherein files are reconstructed using dictionary  
39 lookup means.

- 1 14. A method of transferring data and/or address and/or clock information in optical format within an  
2 integrated circuit.  
3
- 4 15. The method of claim 14, wherein said optical information originates from an electrical signal that  
5 originates within said integrated circuit.  
6
- 7 16. The method of claim 14, wherein said optical signal is converted to an electrical signal that terminates  
8 in a logic device within said integrated circuit.  
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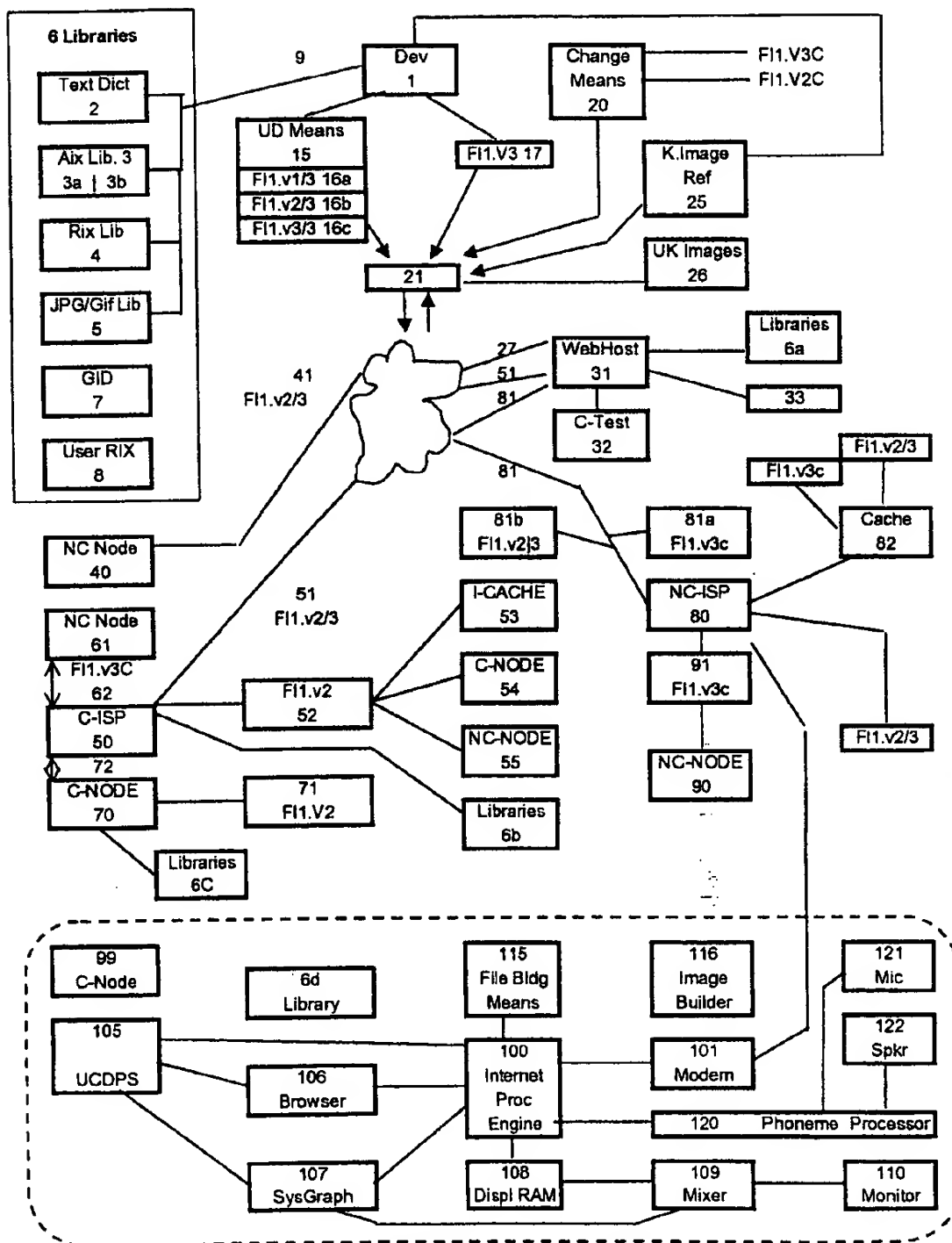


Figure 1



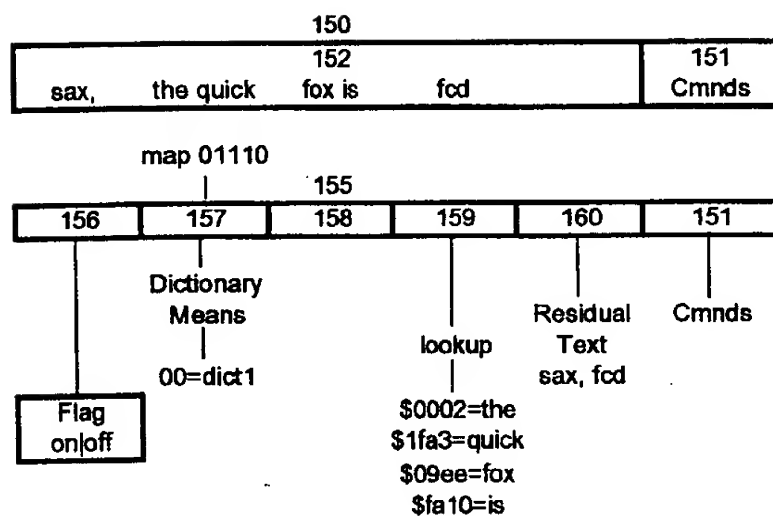


Figure 2

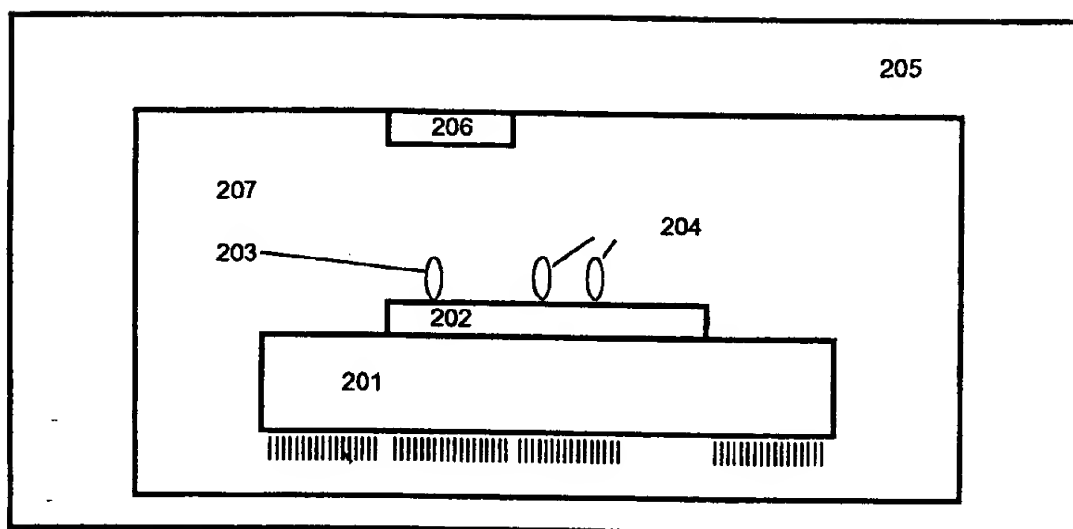
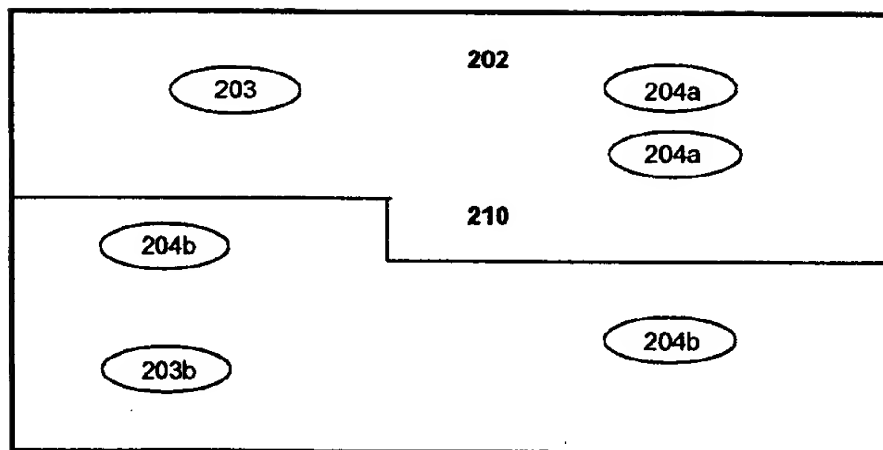
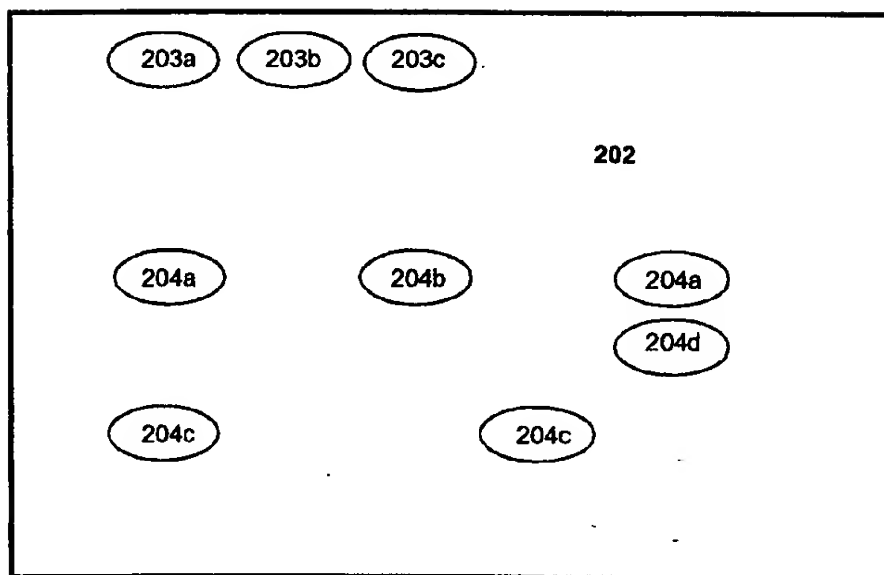
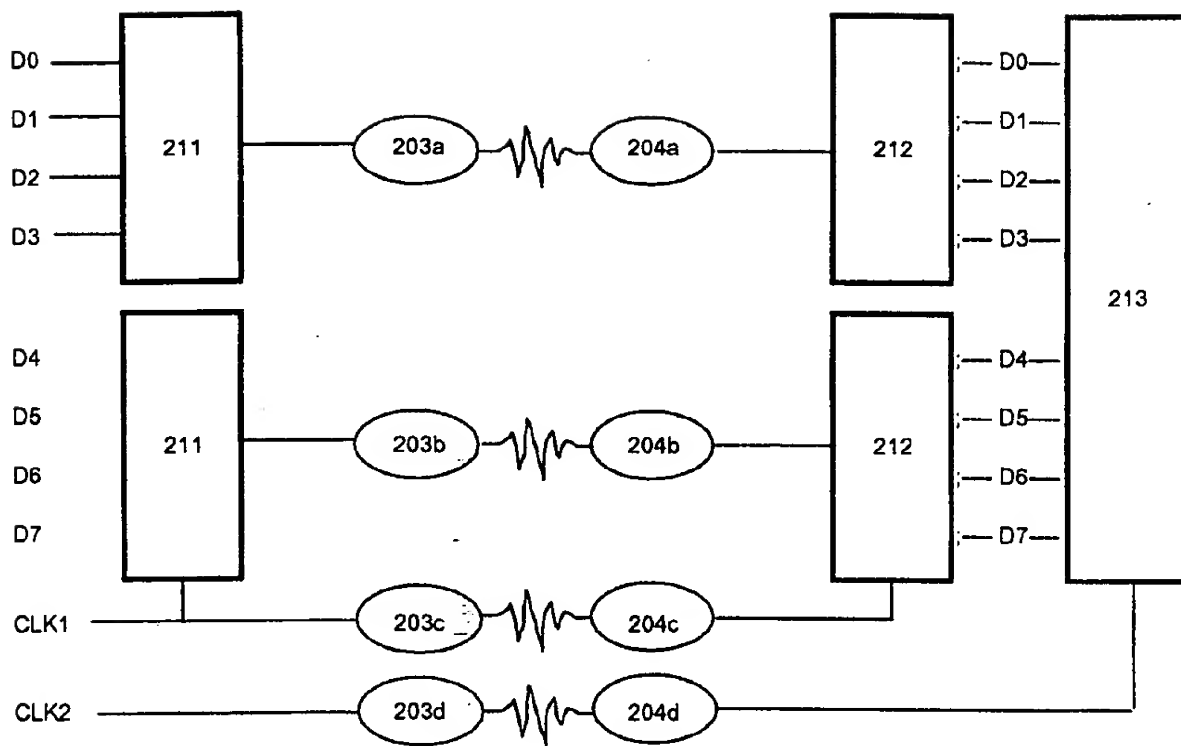


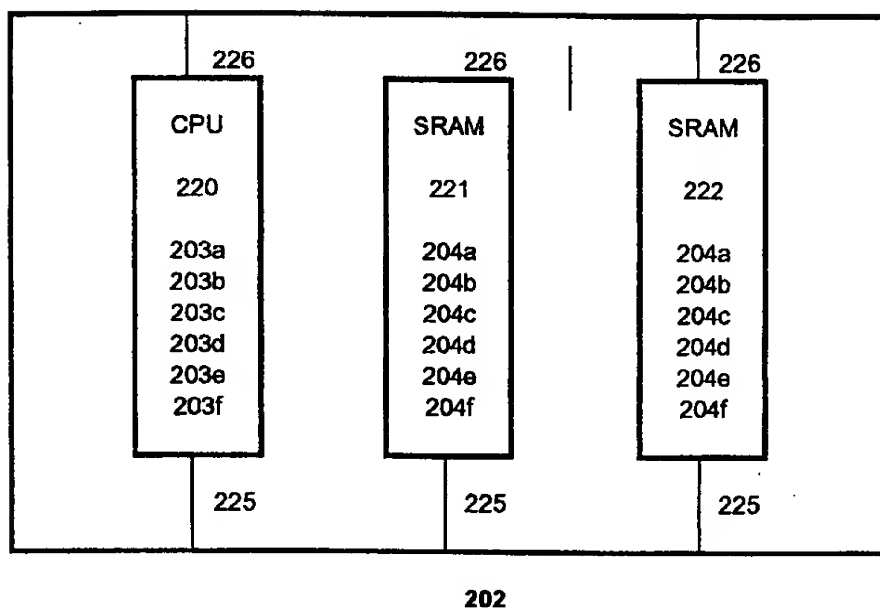
Figure 3

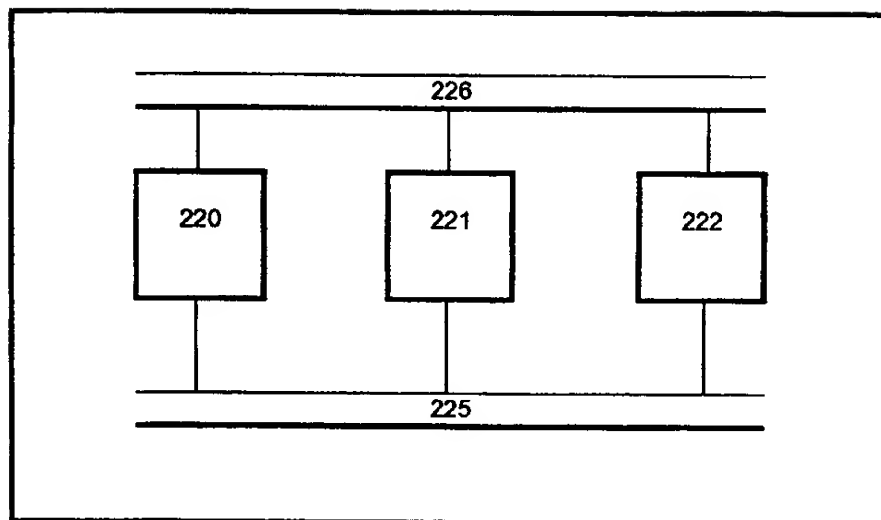


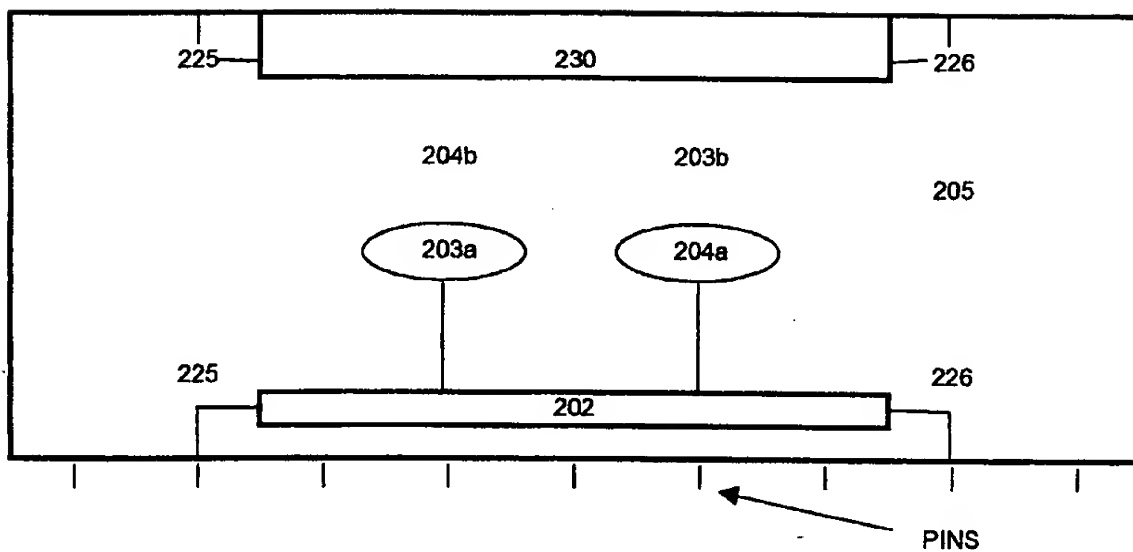
**Figure 4**

**Figure 5**

**Figure 6**

**Figure 7**

**Figure 8**



**Figure 9**



## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/AU 99/00206

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
Int Cl <sup>6</sup> : G06F 017/30		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) G06F, H04L, H04M		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) WPAT, USPTOFT		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4494150 A (Brickman et al) 15 January 1985 Whole Document	1-3, 11-13
X	US 5029200 A (Haas et al) 2 July 1991 Whole Document	1-3, 11-13
X	US 5623604 A (Russell et al) 22 April 1997 Whole Document	1-3, 11-13
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex		
<p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p>		
Date of the actual completion of the international search 30 June 1999		Date of mailing of the international search report 05 JUL 1999
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No.: (02) 6285 3929		Authorized officer  R.H. STOPFORD Telephone No.: (02) 6283 2177

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU 99/00206

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 97/30539 A1 (IBM Corporation) 21 August 1997 Whole Document	1-3, 11-13
X, P	EP 836145 A2 (AT&T Corp) 15 April 1998 Whole Document	1-3, 11-13

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU 99/00206

## Box 1 Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See attached sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-3, 11-13

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

**Box II** Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

The International Application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept. In coming to this conclusion the International Searching Authority has found that there are **four** inventions:

1. Claims 1-3 are directed to a method whereby a file is transferred between a server and a remote node, wherein the file is reconstructed at least in part from information locally accessible to the node.

Claims 11, 12 are directed to a method of transmitting digital telephone conversations wherein the receiving unit includes a library of modules which represent in part the sending sound waveforms.

Claim 13 is directed to a method of transferring files over the Internet, wherein the files are reconstructed using dictionary lookup means.

It is considered that the provision of locally accessible 'files'/modules'/dictionary lookup means' which are used in the reconstruction of the transmitted file/conversation is the first special technical feature.

2. Claims 4-8 are directed to a method of naming image files used on the Internet wherein the images coupled to said files are known to be constant across a plurality of websites.

It is considered that the method of naming image files, used on the Internet, wherein the images coupled to said files are known to be constant across a plurality of websites is the second special technical feature.

3. Claims 9-10 are directed to a method of transferring image files from a server to a receiving node wherein the image is constructed at the receiving node in response to a series of commands.

It is considered that the method of constructing image files, at a receiving node, in response to a series of commands is the third special technical feature.

4. Claims 14-16 are directed to a method transferring data/information in optical format within an integrated circuit.

It is considered that the method transferring data/information in optical format within an integrated circuit is the fourth special technical feature.

Since the above mentioned groups of claims do not share any of the special technical features identified, a "technical relationship" between the inventions, as defined in PCT rule 13.2 does not exist. Accordingly the international application does not relate to one invention or to a single inventive concept.

## INTERNATIONAL SEARCH REPORT

### Information on patent family members

International application No.  
**PCT/AU 99/00206**

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member				
US 4494150	EP98958	JP59023964				
US 5029200						
US 5623604	EP601704	JP07073042				
WO 97/30539	CA2218187	CN1184575	CZ9703540	EP823171	HU9801874	
	PL322830	US5859971				
EP 836145	CA2217370	JP10214239				
END OF ANNEX						